A STUDY INTO THE IMPACT OF THE ADULT INTERACTIVE STYLE INTERVENTION (AISI) ON THE SPONTANEOUS COMMUNICATION OF A GROUP OF CHILDREN WITH AUTISM IN A SAUDI ARABIAN CONTEXT

by

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ABSTRACT

This study evaluates the effectiveness of the Adult Interactive Style Intervention (AISI) for facilitating spontaneous communication by five children aged 5 to 7 with an autism spectrum diagnosis, in an autism-specialist school in Saudi Arabia. The study drew upon the transactional model of child development (Wetherby and Prizant, 2000) and the social model of disability (Rieser and Mason, 1990; Tregaskis, 2002), as well as the concept of intersubjectivity theory. During a six-month action research process, the researcher and staff designed, implemented and measured the results of the AISI intervention on the children's frequency of initiating spontaneous communication and the functions and methods of their spontaneous communication bids. The staff's ability to change their interactive communication style was also investigated. Discussions between participants (staff) and the researcher began the study, and existing educational practice was videotaped and coded for pre-intervention use of AISI principles and children's attempts at spontaneous communication. This was followed by an intervention during which staff were trained to use AISI principles. Post-training educational practice was videotaped and coded for use of AISI principles and children's attempts at spontaneous communication during three school activities (1:1 work, breakfast and unstructured free play). Post-intervention, staff were again interviewed about their experiences. The research produced both qualitative and quantitative data, and resulted in a case study. Interview results were thematically analysed; quantitative data was analysed for significant change as indicated by Cohen's *d* effect size. Staff increased their use of AISI principles after the training intervention, and these changes significantly impacted children's spontaneous communication. This research indicates that AISI can be effective with older children from a non-English-speaking background.

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أهدي هذا العمل والإنجاز

إلى مناي ورضاي وسعادتي

إلى سر نجاحي وبحر عطائي إلى مصدر إلهامي وأفكاري

إلى نبع إبداعي ونبض فؤادي إلي نور عيني ومبتغى أعمال

إلى من لا تكفيهم كلمات الدنيا ولا ينقطع عنهم دعاء، إلى والدي ووالدتي ونعمة حياتي وسعادتي

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LIST OF ABBREVIATIONS

AAC	Augmentative and Alternative Communication
ABA	Applied Behaviour Analysis
AC	Autism Centre
AISCC	Adult interactive style Coding Checklist
AISI	Adult interactive Style Intervention
APA	American Psychiatric Association
BED	Bachelor of Education
BERA	British Educational Research Association
BR	Behaviour Regulation
CARS	Childhood Autism Rating Scale
CB	Challenging Behaviour
CC	Central Coherence
CICCA	Checklist for Initiation of Communication in Children with Autism
CSC	Children's Spontaneous Communication
DARL	Development in Areas Related to Learning
DD	Developmental Delay
DIR	Developmental, Individual difference, Relationship-based model
DSM	Diagnostic and Statistical Manual of mental disorders
DTT	Discrete Trial Teaching
EF	Executive Functioning
EIBI	Early Intensive Behavior Intervention
MI	Musical Interaction
IQ	Intelligence Quotient
JA	Joint attention
MT	Music Therapy
NICE	National Institute for Health and Clinical Excellence
NT	Neuro-Typical
PECS	Picture Exchange Communication System
PRT	Pivotal Response Training
RCT	Randomised Control Trial
SB	Staff Behaviour
SCERTS	Social Communication Emotional Regulation Transactional Support
SD	Standard Deviation
SEN	Special Educational Needs
SI	Social Interaction
TD	Typically Developing
TEACCH	Treatment and Education of Autistic and related Communication handicapped Children
ToM	Theory of Mind
VIG	Video Interaction Guidance
WWC	What Works Clearinghouse, part of the US department for Education

CHAPTER 1: INTRODUCTION

1. Introduction

Autism is an interactional condition that exists in the space between children with inborn limitations or differences, and the people and environments that they interact with. While many styles of intervention, with respect to children with autism, focus primarily on changing their behaviour, it should be emphasised that it may be far easier and more effective for adults, particularly teachers, to adjust the way in which they interact with these children, in order to achieve desired changes in their own behaviour (Bradshaw, 1998). Furthermore, Prizant *et al*. (2006) argue that in the context of facilitating better communication with autistic children, the interaction style of adults plays a vital role. Prizant further asserts that changes to adult interaction style can help autistic children to communicate more frequently (Prizant, 2016).

Hence, it should not come as a surprise that most intervention methods include some aspect of advising adults working with children with autism to change their own behaviour, in order to achieve greater efficacy and to have the greatest potential impact on supporting children's development. This context provides the main rationale for focusing this research specifically on adjustments to adults' behaviour, through researching the implementation of the Adult Interactive Style Intervention (AISI) (developed by Kossyvaki, *et al.*, 2012).

This study aimed to evaluate the effectiveness of implementing the Adult Interactive Style Intervention in facilitating spontaneous communication with children who have an autism

spectrum diagnosis, in the Saudi Arabian context. To this end, it explored the staff's ability to change their interactive style in order to motivate the children to communicate spontaneously. It also measured changes to the frequency of children's spontaneous communication, and the functions and methods of children's spontaneous communication resulting from adopting the intervention.

From this aim, the primary research question was derived:

> When adults change their style of interacting with children with autism, what effect does it have on the way that children initiate communication bids?

Following on from this main research question, four sub-questions were identified:

1. When adults change their interactive style, what differences can be observed in the children's frequency of initiating communication with others?
2. When adults change their interactive style, do children with autism then also adopt different methods of initiating communication?
3. When adults change their interactive style, which activities lead children with autism to initiate more communications?
4. To what extent are adults able to change their interactive style?

1.1 Origins of the study

The decision to conduct this study was informed by a desire to design a more appropriate learning environment for children with autism who attend specialist schools in Saudi

Arabia. Importantly, such an environment should first and foremost be conducive to increasing the opportunities for children with autism to communicate and interact.

About ten years ago, I started working as a teacher of children with autism. At first, I found engaging with children who have autism very difficult, in particular trying to stimulate interaction. Like other teachers in my workplace in Saudi Arabia, I held a stereotyped belief about people with autism, believing that their difficulties with interaction were innate, and therefore almost impossible to overcome. However, I understood the importance of better interaction, stemming from the fact that establishing and maintaining effective social communication and building interpersonal relationships are core difficulties in autism (American Psychiatric Association, 2013). Facilitating communication and interaction is, therefore, one of the biggest challenges facing teachers working with these children, who often appear to exhibit disinterest in people in their surrounding environment, and are thus very difficult to engage in learning activities.

My initial focus was video modeling as a tool for teaching skills to children with autism. Although video has proved to be a particularly useful educational aid, I found that its applicability is still limited. Simply teaching technical skills, without sufficient emphasis on understanding, can inhibit the development of natural interaction. Therefore, after further reading and discussions in relation to social interaction and communcative exchanges, I made a decision to amend the topic of my research, and instead explore the components of a communication-enabling adult style. As I did so, I took into account that one of the most pressing obstacles in teaching children with autism is the absence of effective ways of facilitating interaction between these children and people in their environment.

In this regard, my attention was increasingly drawn to the issue of spontaneous communication and the means of fostering it, especially since this type of communication is largely neglected in the present learning environment in Saudi Arabia. Research (see *Chapter 2*) revealed that it could be beneficial for children if the adults working with them adapted their style of interaction. I therefore decided to conduct a study on the impact of Adult Interactive Style Intervention (AISI) on the facilitation of spontaneous communication by a group of children with autism, in a Saudi Arabian context. AISI had previously been researched with pre-school children in the UK, by a researcher who had developed the intervention and who acted as an active participant in action research (Kossyvaki, *ibid*.). This research investigated its efficacy for use with older children from a different linguistic and cultural background. As a methodology, action research best fit the sample and setting, and met the goal of empowering staff to change and improve practice and supporting each other to do so. Kossyvaki *at al*.'s (*op cit*.) action research methodology was altered by the researcher adopting an observer role and taking a more didactic stance for cultural reasons. A small change was also made to the AISI.

1.2 The Saudi Arabian context of the study

In the last few decades, specialist teachers in Saudi Arabia have been trained to follow various internationally recognised approaches to teaching autistic children, such as: Treatment and Education of Autistic and related Communication handicapped Children (TEACCH) (Lord and Schopler, 1994); Applied Behaviour Analayis (ABA) and Early Intensive Behavioural Intervention (EIBI) (Lovaas, 1981; Cooper, *et al*., 2007); Picture Exchange Communcation System (PECS) (Frost and Bondy, 1994, 2002), which is an icon-based form of augmentative and alternative communication (AAC); and the Son-Rise

or Options programme (Kaufman, 1994; Kaufman 2002). Trainers specialising in these methods have travelled to Saudi Arabia to give classes, and some Saudi teachers have also travelled abroad for training.

These methods have the common focus of changing the behaviour and communication style of children with autism, through organising learning tasks and physical environments (TEACCH) or repetitive discrete trials of skills (ABA, EIBI and PECS). However, each intervention also stresses ways in which adults should change their interactional style, recognising that this strategy has a role to play in reaching the goals of these interventions.

Kossyvaki *et al.* (2012) developed AISI in order to focus more precisely on this aspect of work with autistic children. Following analysis of Kossyvaki's research, I decided to employ AISI principles as a means of assessing how effective AISI can be with respect to fostering the spontaneous communication of children with autism in Saudi Arabia. As part of this plan, it was important to consider how staff in Saudi Arabia working with children with autism may feel about the AISI intervention principles, and whether they would be able to adopt all or some of them in their practice to support children in initiating communication. I needed to ensure that before and during my research, staff would have opportunities to contribute and reflect upon these principles to improve their practice.

I knew that there would be some challenges to implementing AISI principles in the Saudi Arabian context. For example, I was aware that in special education in Saudi Arabia there is usually a focus on teacher-directed pedagogy. I would need to work closely with staff to explore whether, and how, they were able to fit AISI into their practices. In designing the study, I needed to be aware of cultural differences between schools in Saudi Arabia and the original UK setting in which AISI has been trialed (Kossyvaki *et al*., 2012). These issues

were likely to impact acceptance of AISI, use and success with specific elements of AISI, and the research methodology.

Being aware of the need to comprehend AISI fully before employing it in my research, I attended several training sessions and seminars discussing its principles, and the principles of closely related approaches. These included AISI seminars at the University of Birmingham that were managed by Karen Guldberg and Lila Kossyvaki in 2012, intensive AISI training with Kossyvaki in Febraury 2013, and a review of the AISI principles with Kossyvaki in February 2013. I also attended training on the SCERTS approach provided through the organisation Autism Independent UK in March 2013, an Intensive Interaction course in December 2013 at the Autism Show in Manchester, and a training event for parents in April 2013 in Birmingham held by Autism West Midlands. This training had not been made available to staff in Saudi Arabia previously.

In addition, I read widely about developmental/relationship-based approaches in general, such as Intensive Interaction (Nind and Hewitt, 1994, 2001), Social Communication Emotional Regulation and Transactional Support (SCERTS) (Prizant *et al.*, 2006), the Option approach (Kaufman, 1994), Musical Interaction (Methley and Wimport, 2010), and the Developmental, Individual difference, Relationship-based (DIR) model, also known as Floortime (Greenspan and Wieder, 1998, 1999). The common link between these approaches is their focus on highlighting ways and methods of increasing children's engagement, whilst respecting their individuality.

1.3 Significance of the study

This research represents the first study in Saudi Arabia focusing on AISI, which is based on developmental, relationship-based approaches to autism. It is the second major study worldwide on AISI as elaborated by Kossyvaki *et al.* (2012), employing the original AISI principles and one new principle with a group of older children who have a diferent linguistic and cultural background. This study also employed a different approach to action research than Kossyvaki's original work (*ibid*.).

The relevance of this study stems from several factors. Firstly, there exists a considerable gap in the literature surrounding the effect of AISI on facilitating spontaneous communication of autistic children. This study will contribute to addressing this. Secondly, there is a shortage of empirical studies conducted in real-world classroom settings on the development of staff working with autistic children, especially in Saudi Arabia. Such studies are needed for research to translate into effective practice. Thirdly, the growing rate of autism diagnosis, including in Saudi Arabia, underlines the urgency of studying ways of addressing this phenomenon from various angles, including changing adult interactive style. Finally, various studies have confirmed that one of the fundamental challenges facing teachers interacting with children with autism is facilitation of spontaneous communication (Jordan, 1999; Chiang and Lin, 2008; Chiang, 2009). This research explores some ways in which this may be acheived effectively.

Given the focus of this study, it is vital to mention here that communication skills are invaluable for autistic children, particulary the ability to initiate spontaneous communication. This type of communication gives children with autism a sense of control over their interaction with the surrounding environment, and reduces their dependence on

other people's ability to guess or anticipate what they desire or need (Carter and Hotchkis, 2002). In this regard, some authors also argue that the overall quality of autistic children's lives can be improved if they are able to initiate communication (Noens and Van Berckelaer-Onnes, 2004).

Furthermore, the issue of challenging behaviour (CB) is often linked with insufficient communication skills. Hence, an improvement of these skills can translate into reduced problems with CB (Reichel and Wacker, 1993, cited in Prizant and Wetherby, 2005). Reduction of CB provides greater opportunities for learning (including the possibility of inclusion in mainstream learning environments), reduces the likelihood of exclusion from education and of institutionalisation, and can also reduce the risk of injury to the child and others.

Finally, from parents' perspectives, communication barriers with their children constitute a significant stress factor when bringing up children with autism (Bristol, 1984). Teachers have also highlighted limited communication skills as a factor that makes it difficult for pupils to learn (Pituch *et al*., 2011).

Also underlining the importance of this study is the rate of autism among children. Estimates range from 60/10,000 (Medical Research Council, 2001) to 116/10,000 (Baird *et al*., 2006), with higher rates reported in some countries (Centre for Disease Control, 2014). Although reported rates are lower in Saudi Arabia, there is no reason to believe that actual prevalance is lower. Systematic reviews of autism diagnosis and prevalance (for example, Elsabbagh *et al*., 2012) have not supported real differences in prevalance that can be attributed to geographic, cultural or socioeconomic factors. This means that all teachers are

very likely to encounter a child with autism during their career. In countries like Saudi Arabia, where the diagnostic rate lags behind actual prevalence, this can be especially difficult, as teachers may not have a diagnostic label to use as a guide to designing an appropriate educational programme or finding helpful resources. It is obvious, therefore, that there is a need for researching this phenomenon from both a purely theoretical perspective, as well as a more empirical point of view, as this study has sought to do.

1.4 Research design parameters

Given the need for evidence-based empirical studies regarding autism, the present study adopted an action research methodology (Couper and Sampson, 2003; Odom *et al*., 2005; Parsons *et al*., 2011) to produce a case study. Action research is reseach carried out during an activity to improve the methods and approach used to perform such activities. One of the key advantages of gathering evidence via action research is the provision of findings which are directly applicable in the real-world setting of the research, and also in settings with similar parameters as those in which such data has been obtained.

Not only are findings from action research directly applicable in the workplace where it is carried out, taking part in action research fosters a culture amongst education staff where collecting and using data is valued over guesswork or following pre-existing programmes without question, and it encourages staff to be reflective practitioners (Burnaford, Fischer and Hobson, 2009).

Specific to research in autism, many researchers believe that the communicative styles of children with autism are better explored in natural environments and with people who are known to the children (Ogletree, *et al*., 2002; Chiang, 2009), for example at home or in

their familiar school environment. Similarly, Iacono (1999) suggests observing autistic children's interaction when they are performing common activities. These steps minimise the potential inhibiting or anxiety-producing effects of unfamiliar settings, activities and people. Notwithstanding the abovementioned recommendations, the majority of studies on autism and communication have been done in a 'laboratory' environment, hence any conclusions derived from these studies' findings are logically limited when it comes to the development of evidence-based practice in educational settings (Roos, *et al*., 2008; Woodcock and Page, 2010).

The practical manifestation of the study's adoption of an action research methodology (defined according to parameters established by Whitehead, 1989, and Hall and Hall, 1996) therefore took place in a special school for autistic children in Saudi Arabia, which for the purposes of this research will be called the Autism Centre. Because the research analyses a specific group of people in a specific setting over time, it is a case study (Thomas, 2011). This case study looks at the general application of a set of educational practices, factors in their adoption and use by individual staff, and the impact of these practices on individual children.

Five staff and five children ages 5 to 7 (one from each class in the school) were selected to be involved in the current study. The school was one of the best-known and best-resourced specialist schools for children with autism in Saudi Arabia, a country in which only a few such schools exist. Further, teaching staff and school management were interested in taking part in action research, and the school's extended curriculum provided ample opportunities for teachers to employ strategies identified in the literature as helpful (Chiang, 2008a; Chiang and Lin, 2008). The setting and sample fulfilled the research design's requirements

for conducting research in a naturalistic setting.

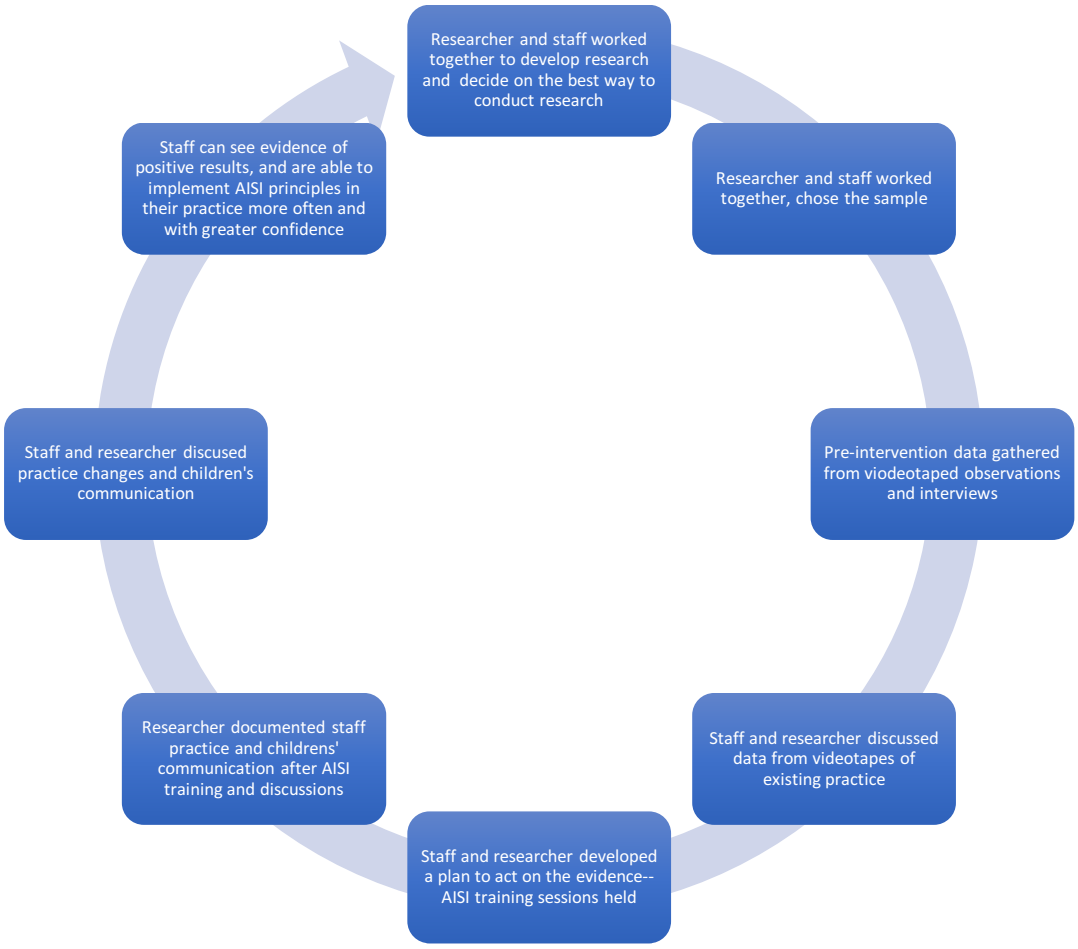
The methodology of the present study was utilised in order to explore the impact on children's spontaneous communication when the staff adapted their interactive style to foster spontaneous communication. Both the researcher and the research participants (staff) contributed to the research design. The agreed aim was to create a research design that would be applicable in a specific real-world setting (as opposed to a laboratory setting), and to introduce AISI in a Saudi Arabian school setting to increase integration of developmental and behavioural approaches within the school's educational practices.

The staff were initially most influenced by interventions that they had more knowledge of and in which they had been trained: particularly Applied Behavior Analysis (ABA) (Cooper, *et al*., 2007); Picture Exchange Communication System (PECS) (Bondy and Frost, 2002); and the Training and Education of Autistic and related Communication handicapped CHildren (TEACCH) framework (Lord and Schopler, 1994), which utilises insights from those approaches, but also incorporates some elements of developmental and sensory-perceptual paradigms. Previously conducted studies indicated that a developmental approach is more encouraging for children, supports their initiative, and improves the staff's interactive style (Potter and Whittaker, 2001; Prizant, *et al*., 2006; Kossyvaki, 2013).

Action research is cyclical rather than linear. A typical cycle begins with identification of a problem that will be the research focus. Next the researcher and staff collect evidence, interpret evidence, act on the evidence, and evaluate results. After evaluation of practice changes, the changes may become permanent, or further cycles may occur to fine-tune practice.

The action research cycle described in this thesis followed these steps. It proceeded as shown in *Figure 1*:

Figure 1: Action research cycle followed in this research.



Further details of the study design and more information about the use of an action research methodology are presented in *Chapter 3: Methodology*.

This study used a mixed-methods data collection approach to answer the research questions, as is proposed by the literature for similar studies (for example, Creswell, 2003; Creswell and Plano Clark, 2007; Ollerton, 2008). Both quantitative and qualitative data was gathered by means of video recordings, semi-structured interviews with staff members who

participated, and evaluation records supported by field notes. Video clips and evaluation records provided quantitative data, which was important for demonstrating change in the children's spontaneous interaction due to adults' changed behaviour. The purpose of the qualitative data, which was gathered through conducting semi-structured interviews, was to investigate the principles of the intervention and their impact, and to provide a deeper and more complex picture of the implementation process. By accessing qualitative and quantitative data from multiple sources, triangulation became possible, potentially strengthening this case study.

1.5 Terminology

There is an absence of consensus regarding the perception of autistic people regarding their diagnosis. Some people with autism use the phrase 'suffer from autism,' this may indicate the character of their relationship with autism. Blackburn (2007) uses the term "*socially disabled*" whilst expressing her wish to be without this disability if possible. Others do not consider autism as a disorder but rather as a condition, or "*a name for a lifelong set of behaviours*." (Jackson, 2002: p. 29). Grandin (cited in Sacks, 1995), a university professor with autism, asserts that autism is just a different way of functioning as a human being, while Arnold (2012: p. 4) goes even further, equating autistic people with a *"cultural minority."*

Increasingly, the views of people with autism are reflected in how autism is also described in the professional literature. For example, Prizant states that "Autism isn't an illness. It's a different way of being human. Children with autism aren't sick; they are progressing through developmental stages as we all do. To help them, we don't need to change them or

fix them. We need to work to understand them, and then change what we do." (Prizant, 2016,: p. 4).

Given the aforementioned differences, the term 'autism' will be employed for the purpose of this study. Bearing in mind the power of language when discussing issues related to people with special needs, and following suggestions presented in this regard in Runswick-Cole and Hodge (2009), the present study rejects the use of terms 'disorder' or 'disability,' as these terms in their essence create a conceptual link with the medical model of disability. The term 'condition' was rejected for its inadequacy for encompassing the various aspects of life of people with autism. When used in this study, the term 'autism' stands for the whole autism spectrum, including Asperger syndrome, atypical autism, Kanner's autism and Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS). This is in an agreement with the usage of the term 'autism' in a study by Jordan (1999) and also with guidelines issued by the National Institute for Health and Clinical Excellence (NICE, 2012).

The terms 'people/children with autism' and 'autistic people/children' are employed interchangeably in the study because as of yet, there is no clear consensus regarding which term is more appropriate. A recent study (Kenny, *et al.,* 2015) regarding the debate on autism terminology may be relevant. Carried out on behalf of the National Autistic Society (UK), the Royal College of General Practitioners and the UCL Institute of Education, it examined the preferences of those on the autism spectrum, and also their families, friends and professionals. The survey, involving 3,470 respondents (502 autistic adults and 2,207 parents of people on the autism spectrum and professionals) found no single preferred term. However, some terms were consistently preferred, such as 'on the autism spectrum.' Most

autistic adults said they preferred 'identity-first' language, such as 'autistic' or 'autistic person.'

To illustrate, one can consider the arguments of autistic authors like Sinclair (1992) and Sainsbury (2009), who object to the use of 'people with autism' as it gives a sense that autism does not affect every single aspect of an individual's life or is something that can be separated from the person. The term 'person with autism,' however, fits with 'people-first language,' which is recommended by some disabled people's organisations (for example, The Arc, 2016). Some people with autism have pointed out that the 'need' for person-first language derives from perjorative ideas about human difference. As one individual writes:

> *"The very idea that person-first language is necessary comes as a result of the medical model of disability. It's bad to define a person by their disability if you think a disability is inherently a bad thing… Identity-first language accepts that neurological differences and impairments are not inherently positive or negative, they are just aspects of a person's identity"* ("Autisticality," 2014).

As recommended by the American Psychiatric Association (APA, 1994), researchers should try to respect the terms that people with a particular dagnosis themselves prefer, hence the present study employs both the terms 'autistic children' and 'children with autism.'

In addition, this study does not distinquish between low- and high-functioning autism, since such a distinction is perceived as not completely accurate by a large number of autistic people. Milton and Lyte (2012) consider this distinction misleading, given that

cognitive profiles of autistic people are often not even. Moreover, as Arnold (2012: p. 3) argues, *"autism is not a two-dimensional thing with a high and a low functioning end… it is like the palette of colours."*

In order to clearly distinguish between various parts of this study, I will refer to myself in both the third person ('the researcher') and also with the personal pronoun 'I'. The former is used when describing the way in which various aspects of the research were designed, whilst the latter is employed when my personal involment in conducting this study is emphasised.

1.6 Structure of the thesis

This thesis is presented in seven chapters, starting with this chapter (*Chapter 1: Introduction*). *Chapter 2: Literature Review* provides the theoretical framework and context for the research, with particular attention to the transactional model of child development, the social model of disability, and cognitive and physiological theories of autism, with a focus on concepts of intersubjectivity and communication-enabling environments, within which the character of adult interaction style plays a prominent role. Evidence-based practice and pedagogy are discussed, along with the pedagogical concepts used in this thesis. Autism research in Saudi Arabia is described, providing context for this study.This chapter also presents research regarding the development of communication in typically developing children and autistic children, communicative functions and methods, and issues facing children with autism with respect to social communication, especially spontaneous initiation of communication. An evidence base is provided regarding the improvement of adults' interaction, based on recommendations from research about a range

of autism interventions. In its conclusion, the chapter introduces the AISI principles, focusing on pedagogical issues, and summarises the literature review.

In *Chapter 3: Methodology* the researcher discusses the parameters of the present study, including its design, details of the research methodology and methods, and the essence of the philosophical framework within which the study is positioned. This chapter also formulates the research questions and introduces key research terms, and includes details of how AISI was implemented and how data was collected.

Chapter 4, *Chapter 5* and *Chapter 6* present the results of the research. *Chapter 4* presents qualitative data related to staff: baseline research results returned from pre-intervention semi-structured interviews, and data from post-intervention interviews that reflect staff experience with applying AISI. *Chapter 5* discusses to what degree staff implemented the AISI principles, and is also based on analysis of video-recorded observations. Where appropriate, reference is made to correlations and contradictions between these data sets, the researcher's field notes (which include data on staff behaviour collected during observations, using a staff evaluation echecklist), and the research literature. *Chapter* 6 presents quantitative data on the measured frequency of children's spontaneous communication before and during the intervention, and the impact of staff changing their communication style during three school activities on the character of children's communication, based on analysis of video-recorded observations.

Finally, *Chapter 7: Conclusion* offers a summary of the most relevant findings, whilst identifying the limitations of the study and suggesting ideas for future research.

CHAPTER 2: LITERATURE REVIEW

This chapter reviews the theoretical framework that underpins this study and contextualises it within current education theory and research. Firstly, an overview of autism research in Saudi Arabia provides the cultural context for this study. The next section discusses the importance of evidence-based practice and pedagogy in this context. A detailed discussion then follows on the theoretical models adopted to address gaps observed in current Saudi Arabian research and practice. This discussion focuses on how this thesis draws upon the transactional model of child development, the social model of disability, and cognitive and hyper-sensitivity theories. Concepts related to inter-subjectivity and communication-enabling environments will also be investigated in some detail due to their particular relevance.

To conduct this literature review, a literature search was conducted using the University of Birmingham Library, the British Education Index, Education Research Abstracts (ERA), the Education Resources Information Center (ERIC) database, and Google Scholar. The search terms used for the initial search used various combinations of the terms 'autism/autism spectrum disorders/ ASD/ autism spectrum conditions/ ASC', 'intervention(s)/ approach(es)/ program(es)', 'communication' and 'facilitative/interactive style,' as well as specific searches on 'Autism/ Saudi Arabia', and 'education/ children with autism in Saudi Arabia.' Following examination of literature returned from the initial search, a snowballing method was used by following up promising references from those articles and books that were most pertinent to the thesis topic. In addition, thesis supervisors and attendance at training sessions and conferences suggested further sources

for examination. The literature on autism is exceedingly large (the initial set of electronic searches returned well over 2000 potential sources), and much of it is not relevant to this thesis. Criteria for inclusion in this review were: relevance to the theoretical background; methodology of the research, with well-designed studies preferred over case studies; the setting of the research, with research set in naturalistic environments preferred to laboratory research; all studies detailing and examining AISI and closely related approaches; and all studies related to autism in Saudi Arabia. In addition, key sources on other educational interventions were also included as a basis for discussing the broader picture within which AISI and closely related approaches are situated.

2.1 Overview of autism research in Saudi Arabia

This overview of autism research in Saudi Arabia provides a context for the study. This overview illustrates the critical need for it, and facilitates an understanding of the population and settings for which it is intended. It has been set out as four sub-sections that reflect the existing research base: (1) Prevalence of autism studies and information; (2) Other medical and clinical research; (3) Education research; and (4) The provision and practice of education for autistic children in Saudi Arabia. These sections illustrate that the focus of autism research in Saudi Arabia has been on epidemiology and medical treatment, while there has been little research undertaken on education practice. Whilst this overview highlights the Saudi Arabian context, some references to other countries are included, where deemed appropriate and beneficial.

2.1.1 Prevalence of autism and rate of autism diagnosis in Saudi Arabia

The prevalence of autism in the UK from 2004-2010 was examined by Taylor *et al*. (2013). They concluded that it has plateaued across the UK population, at 3.8/1000 boys and

0.8/1000 girls aged 2-8 years. Research by the Centers for Disease Control and Prevention shows that, globally, there is a 1 in 68 chance that a child will be diagnosed with autism (CDC, 2012). Other estimates range from 60/10,000 (Medical Research Council, 2001) to 116/10,000 (Baird *et al*., 2006).

According to Anello *et al*. (2009), increased recognition, assessment and awareness of autism over the last few decades is predominantly linked to growth in existing research evidence. Elsabbah *et al*. (2012) conclude that there have been major advances in terms of genetic, biological and environmental origins of autism. Significant strides have also been made towards the development and validating of screening and diagnostic instruments, as well as understanding effective interventions.

Using these international prevalence figures, and with the availability and use of the latest diagnostic criteria and services (Dawood and Hazawii, 2013), it is expected that 322,459 children in Saudi Arabia would have an autism diagnosis. However, a national research study on autism conducted by King Saud University, in collaboration with the Saudi Autistic Society (2008) and focusing on 16 centres across the country, indicated that in 2007, there were approximately 120,000 children with a formal diagnosis of autism in Saudi Arabia. Later research conducted by the Prince Sultan Center for Disability Research in 2013 found that the recorded number of children diagnosed with autism in Saudi Arabia was 187,075 (Al-Waznah *et al.*, 2013). The different statistics found in these two studies, conducted six years apart, may be the result of differences in diagnostic criteria and geographic reach. However, these numbers still do not reflect US and UK estimates.

Possible reasons for this disparity include: the comparatively limited availability of diagnostic services (Eyal *et al*., 2010); lack of parental incentives to seek a diagnosis (*ibid*.); and factors related to culture (Dyches *et al*., 2004; Jegatheesan *et al*., 2010), such as predominant styles of interaction and reciprocal social exchange between students and their teachers in Saudi Arabia, compared with children in other countries. The extent to which Saudi boys can participate in reciprocal exchanges with their parents, older family members, teachers and adults in general, is comparatively constrained (Alqarni, 2002) until they become adults themselves (Alnamlah *et al*., 2006). Cultural parental beliefs about appropriate childhood behaviour impacts whether or not they seek an autism diagnosis for a child, and what choices they make about parenting and education if a diagnosis is received. Cultural factors also seem to have a causal effect on patterns of communication, as seen in a comparative analysis of two samples of autistic individuals: one Egyptian and the other Saudi (Almanasef *et al*., 2011).

2.1.2 Autism research in Saudi Arabia

The existing research base in autism in Saudi Arabia will be described below and in the following two sections. Few studies have direct relevance to this research, limiting the availability of relevant insights from autism research for parents and professionals in Saudi Arabia. Publication of empirical research on autism in Saudi Arabia commenced around 2002, with a study assessing the current situation (Alothman, 2002).

Research has, so far, focused on establishing accurate medical diagnosis and an estimate of the prevalence of autism in the Saudi population (Alzahrani, 2013), which was data required in order to understand the scale of prevalence in Saudi Arabia. This includes discerning at what age Saudi children tend to be diagnosed with autism, the prevalence of

various autism spectrum diagnoses, and any gender differences, so that sufficient and effective treatments or interventions, and special needs education facilities and practices can be developed.

To date, Saudi research on autism-related treatment and education has been limited, and dominated by behavioural approaches (Almosa, 2012) such as ABA/EIBI, PECS and to some extent TEACCH. These interventions aim to help autistic children to reach their full potential, developing their communication and social skills, language, motor skills, appropriate behaviour, and greater autonomy. Research indicates that some early intervention programmes with foundations in behaviour modification and comprehensive assessment are available to some autistic children in Saudi Arabia (primarily to those receiving autism-specific education services through specialist centres or in-home services). Social Stories are also common, with occasional, limited and sometimes inaccurate implementation of developmental/relationship-based interventions, such as Son-Rise and DIR (Alzarie, 2014). As these interventions have also been shown to be effective for most children with autism, the lack of research on implementing them in a Saudi Arabian context indicates a need for further investigation. Interventions are discussed later in this chapter.

2.1.3 Medical and clinical research

Much of the research on autism in Saudi Arabia has focused on medical and clinical aspects (Alotaibi, 2015; Alzarie, 2014). Al-Ayadhi (2005: p. 1) focused on the Saudi Arabian context by testing "the autoimmune mechanisms in the pathogenesis for autism in autistic children." In their Saudi Arabian research, Halepoto and Al-Ayadhi (2014) focus on identifying potential autism biomarkers, to *"lead to a better understanding of the*

pathogenesis required to design the most effective treatments of autism" (Halepoto and Al-Ayadhi, 2014: p. 178) and allow earlier and more targeted methods for diagnosis and intervention.

Zeina *et al*. (2014), in an attempt to achieve a better understanding of the underlying causes of autism, demonstrated that autism is associated with communication and social interaction abnormalities in Saudi Arabia. Their focus was more on therapeutic interventions than communication interventions. Similarly, the study by Al-Wakeel *et al.* (2015) focused on a comparison of *"the usability of mobile applications developed for people with AS"* (*ibid*.: p. 203).

2.1.4 Education research in Saudi Arabia

Researchers have noted that the education and services available to pupils with autism in Saudi Arabia are developing due to the rapid increase in the number of children diagnosed with autism, with a focus on autism awareness and appropriate diagnostic services. The Ministry of Education in Saudi Arabia (2002) requires that free education be provided to students with disabilities, to ensure opportunity for every child to become independent and educated. Since Saudi students with autism are considered as 'students with disabilities,' they must legally be provided with appropriate services (*ibid*.).

Autistic students were initially sent to specialist schools and centres for autistic children. The aim of such institutions was to improve services provided and highlight the latest autism-related scientific theories for professionals and families of autistic children. However, the Ministry of Education commissioned an Action Plan in 2004 to establish mainstream classes for autistic children who were deemed eligible, and ready for,

mainstream classes**.** The Ministry also aims to create new practical strategies to develop interactive forms of communication, including assistive technologies (Aljaafari, 2004).

However, published research and teacher training in Saudi Arabia have not focused on recent developmental/relationship-based approaches used in the West to facilitate communication with children who have autism. Consequently, most Saudi teachers still heavily rely on behavioural approaches. Developmental approaches, such as TEACCH, and elements of Son-Rise, are only occasionally, and sometimes inaccurately, implemented (Alzarie, 2014). AISI Principles are based on developmental approaches and encourage staff interaction with children with autism.

Saudi studies on autism and education largely focus on researching attitudes among special needs teachers towards certain teaching techniques. For example, Almasoud (2010: p. 16) examined:

> *"the core characteristics of individuals with autism (intellectual and cognitive ability, communication ability, social interaction and relationships and sensory sensitivities) and linked them to practice in the classroom by showing how the classroom, the curriculum and teaching methods should be modified to meet the special needs of these students, using Division TEACCH."*

Through a comparative analysis of Saudi Arabia and the UK, Almasoud (2010) concluded that support provided via mainstream educational placements within Saudi Arabia fell far below that of the UK, possibly due to insufficient teacher training in autism.

Haimour and Obaidat (2013) followed with research on attitudes of schoolteachers towards the inclusion of autistic students in the classroom in Saudi Arabia. They concluded that:

> *"Different variables such as teachers' position, education level, experience, and contact with students with autism were found to have a significant direct effect on teachers' attitudes toward inclusion of students with autism. Understanding teacher characteristics or other factors related to attitude toward inclusion of students with autism are important in efforts to reduce negative attitudes toward inclusion in general."* (*ibid*.: p. 29)

These researchers found that *"teachers who worked previously with autistic children had a higher level of knowledge about autism, as compared to those who had no previous contact with students with autism"* (*ibid*.: p. 54). They recommended that all Saudi schoolteachers who work with autistic children, regardless of specific qualification, should receive training in the effective educational practices for this group of students. This reported variance in teacher attitudes suggests a need for further and more detailed research on attitudes, to achieve significant movement towards inclusion in Saudi Arabia.

Researchers have only recently begun to map educational services and assistive technology. They noted that potential roadblocks to the inclusion of autistic children and the provision of high-quality special education, are a lack of training and knowledge, and negative adult attitudes. To the researcher's knowledge, there are no published studies on adults and interaction with autistic children or facilitation of spontaneous communication by autistic children in a Saudi Arabian setting.

This highlights a gap in Saudi research and practices for interacting with autistic children. It also demonstrates a need to introduce and evaluate evidence-based developmental approaches, which have been used effectively in a specialist school for autistic children in the UK (Kossyvaki, 2012) and in other settings. To assess available educational support for autistic children in Saudi Arabia, the next sub-section reviews current education provision and practice.

2.2 Autism education provision and practice in Saudi Arabia

Al-Ayadhi and Bashir (2014) state that autistic students in the country's mainstream state-run schools are likely to stay undiagnosed, since the majority of Saudi teachers do not know how to identify the symptoms of autism. As mentioned earlier, official policy dictates inclusion for more able diagnosed children, but several factors may prevent this or limit its success. Almasoud (2010) discovered insufficient training for state school teachers and subsequent poor provision. Many autistic children are in special schools and centres located in cities like Jeddah, Riyadh and Dammam, and *"all of these centers adopt TEACCH, ABA, EIBI as a comprehensive approach"* (Al-Ayadhi and Bashir, 2014: p. 492).

Almasoud (2010: p. 3) writes:

> *"They have specialists and experts in the field who are able to work effectively with children—and their parents—from an early age through adulthood. They adopt many approaches and interventions and mainly use the Treatment and Education of Autistic and related Communication handicapped Children (Division TEACCH) as the foundation for their educational programmes."*

Behavioural intervention approaches like ABA, EIBI, and PECS are also prevalent at these centres (Almasoud, 2010; Al-Ayadhi and Bashir, 2014), without sufficient consideration of developmental/relationship approaches. Teachers are therefore trained to be didactic.

Al Zarie (2014), who focuses on the Autism Center located in Jeddah City, writes about the progress in implementing a forward-thinking curriculum, which claims to include: (1) structured training, such as activity routines, gradually reduced, to help children practice daily life activities; (2) behavioural and cognitive education; and (3) behaviour modification through reinforcements. Yet, despite claims of using the Option/Son-Rise approach, alongside ABA, EIBI, and PECS (Al Zarie, 2014), the lack of developmental/relationship approaches and of focus on child-adult interactions remains apparent. Instead, the Center implements its programme by assessing children's behavioural, cognitive, social and language skills to formulate their individual education plans (*ibid*.).

Al Zarie (*ibid*.) explains that intervention at the Autism Center begins between ages 3 to 6 years, where the focus is on the child rather than the adult. The aim is for the child to develop skills including response, visual communication, and attention skills. It is then expected that fundamental communication skills will develop into good social and behavioural skills, through various services provided by the Departments of Speech and Communication, Sports, Art Education, Computers, and a range of recreational activities at the Centre (*ibid*.). Further the Center has very little teacher training provision in RDI or Intensive Interaction, in comparison to other training that is apparently supported by

foreign experts – professors and doctors from America and Europe (Jeddah Autism Center, 2015).

A Social Service Department at each of the centres offers the children's families information about autism, help with questions, and provides a point of contact. It also prepares parent training courses together with Training and Public Relations Departments. It seeks to increase teacher, parent and community knowledge of autism via seminars, lectures, workshops and training courses (Al-Hazmi, 2003; Al-Hazmi *et al*., 2003; Jeddah Autism Centre, 2015).

Drawing attention to the provision and practices associated with autism, Haimour and Obaidat (2013) noted that American speech pathologists, *"reported the most knowledge in behavioural and communication characteristics associated with autism, and the least knowledge in education and intervention strategies*" (Haimour and Obaidat, 2013: p. 46). Therefore, since autism experts from America have been said to be prevalent in Saudi Arabia (Jeddah Autism Center, 2015), the likelihood is that behavioural and medical approaches towards autism can be expected to prevail in Saudi Arabia, with insufficient attention towards education and relationship-based intervention strategies. Similarly, these authors say that American intervention service providers:

> "*... reported wanting to use only those methods shown to be effective, but few had analysed the literature on the techniques used. All providers reported concerns about adequate training and desired further information on interventions that are effective with autistic children"* (Haimour and Obaidat, 2013: p. 46).

The implication again is that a lack of understanding regarding developmental and adult-focused interventions is likely to be transferred to the teachers in Saudi Arabia because of significant reliance upon foreign advisers.

In conducting a review of international literature regarding best practice provision in the education of autistic people, Parsons *et al.* (2009: p. 117) write:

> *"Other approaches to intervention may be as effective as intensive behavioural programmes but these 'have not been rigorously evaluated'–something that also requires urgent attention (and funding) from a research perspective… (there is a) lack of robust, empirical evidence in many areas of practice and provision."*

According to these authors, the lower frequency of using developmental and adult-focused interventions around the world is said to stem from insufficient research and empirical evidence, and they suggest that more funding is required in order to address this issue. The research carried out for this thesis is intended to further progress towards this goal.

Hahler and Elsabbagh (2015: pp. 62-63) drew attention to the importance of international co-operation as a means to improve the provision and practice of education for autistic people. They write:

> *"In recent years, WHO has expanded their efforts in the area of autism through developing partnerships at the global level with key international stakeholders. Similarly, the Grand Challenges in Global Mental Health Initiative has highlighted the need for the development of a global research agenda to create shared access to data, expertise, and capacity-building*

> *opportunities. Together, these will help bridge both knowledge and treatment gaps to lead to improvements in the lives of those affected and their families."*

Yet despite their valid call for increased global co-operation, these authors' reference to *"treatment"* of autism suggests a possible focus on the medical model where *"problems"* are within the child and should be treated through medical analysis (Hahler and Elsabbagh, 2015). In contrast to this global popularity of the medical model in educational provision and practice design, the theoretical framework chosen for this study supports development of an AISI that is developmental and adult-focused.

Almasoud (2010: pp. 3-4) further discusses the international practice and provision of education for autistic children by comparing Saudi Arabia to the UK. She states:

> *"In the United Kingdom, the type of placement varies depending on the severity of the condition, the student's intellectual ability and the experience and expertise of the teachers. The options for preschool or school age children are mainstream school, school for those with severe learning difficulties, special schools or units for other types such as language units, specialist units for autism run by independent organisations or authorities, and home-based programmes."*

Therefore, autistic children in the UK are described as having a greater range of educational options, as compared to Saudi children, along with considerations for both students' and teachers' levels of abilities. Almasoud (2010) further claims that mainstream schools in the UK, assisted by various government initiatives, implement a variety of interventions supplemented by:

> "*… visits of professionals such as physiotherapists, occupational therapists and speech and language therapists. Finally, all schools—mainstream schools and special schools—follow the National Curriculum"* (Almasoud, 2010: p. 4).

This suggests that the UK, a country with a more advanced economy, has developed better educational provision and practices for autistic children than Saudi Arabia. However, Almasoud (*ibid*.) implies that the UK is still focusing on behavioural and medical approaches rather than developmental and adult-focused approaches. Almasoud (*ibid*.: p. 4) concludes:

> *"From the comparison given above, it is obvious that there is a significant need for increased training of teachers in Saudi Arabia, along with the need for increasing government initiatives. In addition, enhancing diagnosing services is strongly required, especially to identify students who have high functioning autism in order to provide them with the correct support. It is also necessary to provide appropriate educational placements depending on the severity of the condition and to adopt the best possible interventions and educational approaches in order to meet the special needs of these students and to provide an inclusive educational environment for them."*

There is clearly a requirement for increased teacher training in Saudi Arabia, supported by additional government initiatives. There is also a need to adopt well-evidenced interventions and educational approaches, so that the specific needs of autistic children can be met in both specialist and inclusive educational environments. The researcher feels that educational provisions and practices that are developmental and adult-focused, such as an AISI programme, would best fit those needs, thus justifying the development of this line of research presented in this thesis.

2.3 Evidence-based practice and pedagogy

As mentioned in the previous section, Saudi education researchers frequently make appeals for evidence-based practice and pedagogy. Therefore, this section has two main aims: to discuss the importance of evidence-based practice to the research undertaken for this thesis, and to provide the reader with an overview of relevant evidence-based pedagogy.

2.3.1 Evidence-based practice, and the evidence base for autism interventions

The concept of 'evidence-based practice' in education, is derived from the concept of 'evidence-based medicine' that arose in the 1970s (Odom *et al*., 2005). Proponents of the concept, which has become very prevalent in the US after the adoption of the No Child Left Behind Act in 2002, valorise methods that have been tested using experimental designs and that produce consistent results (Marder and Fraser, 2012.)

McGee and Morrier (2005) further contend that despite heterogeneity, a single methodology has been prescribed by some national intervention models for individuals with autism. However, McGee and Morrier (2005) have suggested that every autistic student is unique in terms of the educational needs they present, which in turn makes it complex and challenging to train teachers to work with this population. Handleman and Harris (2008) argue that since there is heterogeneity in the population of children with autism, it is not necessarily the case that an approach that is successful for certain students will also be successful for others.

According to Stahmer *et al*. (2005), efficacy has been demonstrated by specific teaching techniques that are frequently promoted for children with autism or subgroups of children

with autism. These techniques include: SCERTS; incidental teaching; Pivotal Response Training; and one-to-one discrete trial training (*ibid*.). However, in order to empirically validate the branding of an intervention or strategy as 'evidence-based,' it is critical that efficacy be demonstrated. The complexity of evidence-based practices is a major challenge in their implementation for children with autism in the community setting. According to the National Standards Project (2009), the strongest evidence in support of a strategy is presented regarding strategies based on the principles of ABA. However, while there have been many studies performed regarding the efficacy of ABA, most of these have been single-subject case studies of limited duration. Other ABA studies have been criticised on design grounds or used as the basis for misleading claims, according to Herbert and Brandsma (2002) and the New Zealand Guidelines Group (2009), amongst others.

Leaf and McEachin (1999) underline that strategies such as discrete trial teaching (DTT) are extremely structured and take place in one-on-one settings, so research evidence may not be applicable to other children and other settings. Other interventions are naturalistic, more complex to implement, and can be carried out during daily activities or individually, all factors that make it difficult to generate evidence of general efficacy. In addition, Milton (2012) argues that almost all interventions are based on a deficit model of autism and pursue goals set by non-autistic adults, rather than working from the innate capabilities and motivations of people with autism themselves.

2.3.2 Teachers' professional development and use of evidence-based practices

It has also been suggested that training teachers to use evidence-based practice can help bridge the gap between academic research and school practice (McIntyre, 2005.)

Implementation of evidence-based practice also depends on the capabilities of teachers, including their ability to evaluate heterogeneous learner needs and adapt practices to fit. Smith *et al*. (2000) argue that in order to attain concurrent proficiency in various intervention techniques, and to incorporate the development of suitable student goals, a full year or more of supervised practicum training might be required by teachers. However, it has been observed that current approaches to training and professional development do not prepare practitioners to implement evidence-based practices with students with autism. Barnhill *et al*. (2013) state that coursework related to students with autism is now offered by an increasing number of teacher preparation programmes, but there is a wide variation in the extent to which evidence-based practices are addressed in these programmes and the quality of those efforts.

The implementation capacity of teachers in terms of evidence-based practices for students with autism is marginally impacted by the leading professional development approaches. Hall *et al*. (2010) identify stand-alone workshops as a major avenue for professional development, but with marginal impact on precise implementation of evidence-based practice. Russo (2004) finds that schools sparingly use individualised coaching and mentoring (Kretlow and Bartholomew, 2010), professional development models of that have proved to be more effective.

Owing to the limitations of in-service and pre-service training, there is ambiguity as to the preparation levels of teachers for implementation of evidence-based practices for students with autism. Therefore, understanding the role of teacher training can help contribute to knowledge of adult interaction style and use of specific communication interventions.

Researchers have found that there is not enough research on the way teachers can be best prepared to handle the challenges presented by this population, especially since most special education teacher programmes devote limited time to autism (Scheueremann *et al*. 2003). For example, according to the National Centre on Teacher Quality (2012), explicit licensure requirements or policy associated with teachers working with autistic children are currently available in only a few US states, and in some states these are focused on ABA certification (Hart and More, 2013). The UK has no teacher licensure requirements specific to autism, nor does Saudi Arabia.

In addition, although it is highly probable that students with autism will be present in the classrooms of both general and special educators, most graduate teachers are not sufficiently prepared to use evidence-based practices for students with autism (Morrier *et al*., 2011; National Research Council [NRC], 2001). Preparation was limited to one introductory course for most general education major teachers, plus other courses on instructional accommodations and techniques addressing various disabilities for special education majors, without any focus on specific interventions (*ibid*.)

The NRC concluded that personnel preparation is one of the weaker aspects of effective programming for autistic children and their families (*ibid*.). Morrier *et al*. (2011) conducted a state-wide survey on the type and nature of training provided to teachers of students with autism. It was found that usually a half- or a full-day workshop was devoted to autism, which was attended by fewer than 15 percent of teachers enrolled in the training programme through their university teacher-preparation programme. Furthermore, no

correlation was drawn between evidence-based practices and the training type. Thus, Hess *et al*. (2008) contend that it is quite evident that evidence-based instructional strategies are rarely employed by those teachers currently teaching students with autism.

Hess *et al*. (*ibid*.) also observed that evidence-based strategies are rarely used by educators in the case of students with autism. There are doubtlessly several factors that contribute to the lack of implementation of evidence-based practices, or these not being implemented by teachers in the intended way. One of these is that teachers often receive limited instructions regarding interventions, typically a manual and attendance at a didactic workshop.

2.3.3 Evidence-based practice in Saudi Arabia

There is a lack of studies by Saudi researchers examining the direct impact of evidence-based strategies. There is also a lack of relevant training for schoolteachers in using these. Researchers have suggested offering professional development programmes throughout the school year. Included in these programmes should be information regarding educational interventions and effective instructions, with emphasis on evidence-based practices in special education and teaching (Alquarani, 2011).

Altoabi (2015) conducted research in the US on the knowledge and use of Applied Behaviour Analysis for autistic students, with an express intention of achieving results that could be translated into improving Saudi practice. He examined 158 teachers of students with autism, from different autism programmes, across public schools and institutions. Use of evidence-based approaches was found to depend on teacher interest, more than systemic training.

Without training in evaluating autistic children's individual needs and in using various methods, teachers find it difficult to evaluate claims about the evidence base for a method, and may not be able to determine which methods are suitable for a specific child. Information about the evidence base for various practices used in the education of autistic children is presented in further sections of this chapter.

2.3.4 Evidence-based pedagogy

Pedagogy refers to the theoretical concepts and methods of teaching. Therefore, whilst the proponents of evidence-based practice discussed in the previous sub-sections may propose intervention strategies that are supported by favourable empirical results, there is no standardised approach that can be relied upon entirely. Interventions must be chosen to fit the child and the teaching goal, and thought should also be given to how they fit into the overall pedagogical approach in the school. For instance, Reichow *et al*. (2008: p. 1311) write:

> *"Recently, we sought to examine current research (i.e., publication between 2001 and 2005) on interventions for young children with autism (i.e., children with autism who were less than 8 years old) to determine if any intervention had accumulated the empirical evidence needed to be considered an evidence-based practice (EBP). We quickly realized that previous methods for determining EBP did not meet our needs, and that a new method for evaluating the empirical evidence was required."*

However, a few years later, they claimed much progress had been achieved with respect to the adoption of evidence-based practices in autism across the US and Europe. Reichow *et al*. (2011: p. 382) state:

> *"The increased awareness of new methods for intervention and the documentation of approaches shown to be effective (at least for some individuals in some circumstances and in some situations) have led to a marked increase in knowledge of intervention approaches. As a result, some school districts have often adopted one model program over others as "their" program for children with autism, e.g., ABA, TEACCH, or developmental models. On the one hand, this can help to target training and increase consistency and treatment fidelity. On the other hand, the reliance on a single approach discourages the flexibility needed to truly individualize an educational intervention program."*

Increased use of evidence-based practices in autism can be associated with improved understanding achieved through developments in pedagogy, as new theoretical concepts of teaching and intervention adoption are disseminated. For example, although more schools are now implementing new intervention approaches for autism, Reichow *et al*. (2011) warn against the adoption of a single approach, because such inflexible uniformity does not provide sufficient allowance for the uniqueness of the children.

In addition, Ogletree *et al.* (2007) have also identified theoretical practices which they suggest should be included within the design of an intervention strategy. They argue (p. 242):

> *"Effective communication-based practices are at the centre of a 'goodness of fit' between a child and environmental demands, culturally competent family centred practices, and ecological intervention perspectives. These bidirectional spheres all influence each other and, in turn, impact intervention."*

These authors further reason that an optimum intervention strategy to develop communication should conform to a goodness of fit, where "*goodness of fit implies an individual's intervention program is adequate to address the opportunities and changing demands of the environment*" (*ibid*.: p. 243). This again implies that the style of teaching and intervention should be flexible so that it can be tailored to the uniqueness of each child and different environments. This provides backing for interventions like AISI that encourage child-centred pedagogy.

The theoretical model of ecological systems, as originally proposed by Bronfenbrenner (1979), is further referred to by Ogletree *et al.* (2007) in order to argue that intervention should also regard the child's environment as a number of influential and interconnected systems. Placing the child at the centre of this theoretical model, the ecological system that is said to be closest to the child and so most influential to their development is the one which includes *"parents, teachers, and anyone in a close relationship with the individual"* (*ibid*.: p. 243). These authors note that the child's development is especially influenced by their close relationship with parents and teachers: "*Intervention within an ecological framework is predicated by an assumption that social relationships and environments influence development*" (*ibid*.: p. 243). Therefore, as per the AISI designed for this thesis, attention should be given to the role and behaviour of adults, instead of focusing primarily upon 'treating' the child's 'problems.' Ogletree *et al*. (*ibid*.) further assert that intervention strategies have a greater chance of developing the child's social communication if teachers, parents and associated professionals work in close co-operation. Based on this type of working relationship, a flexible intervention (such as the AISI proposed in this thesis) can

be designed and then amended when deemed appropriate. Indeed, the idea that *"intervention must be both dynamic and flexible to meet the changing demands of environments and individuals"* (*ibid*.: p. 244) is a fundamental precent incorporated in the design of this thesis' AISI.

2.3.5 Cultural variation

Another theoretical concept that has been recommended for inclusion within intervention design relates to that of cultural variation. For example, it has been stated that *"cultural explorations teach us that what is more needed than any autism prevalence data are the acceptance of and desire to understand individual differences in this diverse twenty-first century"* (Kim, 2012: p. 535). The implication is that one intervention approach cannot fit all, because of both cultural and individual differences.

It should not be automatically assumed that children from different linguistic and cultural backgrounds will respond in exactly the same way to interventions. Research is needed to investigate how well a particular intervention 'fits' in a different cultural context, and sometimes adjustments will need to be made. An example of this can be given regarding TEACCH, which was developed in an English-speaking country (the US) that uses a left-to-right reading and writing system. TEACCH practitioners are encouraged to set up left-to-right work systems for students. This might not be appropriate in a country that uses a right-to-left system for reading and writing, such as Saudi Arabia.

With regards to relationship-based interventions like AISI, attention will be needed to the potential impact of different ways that parents and children and teachers and children normally communicate in a specific culture. This attention can be critical: if

communication patterns and norms are observed that may be developmentally detrimental, researchers need to challenge these practices based on the evidence they have found.

2.4 Theoretical framework

As reference to the work of Olgeltree *et al*. (*2007*) in the preceding section illustrates, choice and application of interventions depends greatly on the theoretical framework accepted and used by educators. In the following section, will set out the theoretical framework that was used as a guide for applying an AISI to facilitate spontaneous communication from autistic children in Saudi Arabia. Building on the transactional model of child development and the social model of disability, this thesis' framework will also include elements of cognitive, hyper-sensitivity, inter-subjectivity and enabling communication theories. The section will then conclude with a summarisation of this thesis' theoretical framework, along with a discussion of its implications towards examining an AISI.

In seeking to establish a theoretical framework to guide the research carried out for this thesis, it is noted that previous attention has often focused on the skills and behaviour of the autistic child that parents and professionals intended to develop or change. However, in contrast to this approach, which concentrates on what the child needs to do, it can be argued that attention should instead focus on the behaviour of the adults and the way in which they interact with the autistic child. As noted by Ogletree (*ibid*.), the child's behaviour and learning occur within an ecological system, and changes to any part of this system will have an impact. This focus forms the basis of designing an AISI to facilitate

and influence the child's development, by encouraging them to initiate spontaneous communication with the adult.

2.4.1 Transactional model of child development

Numerous studies have revealed the difficulties facing teachers and other school staff when initiating communication with autistic children (for example, Kroger and Nelson, 2006; Kossyvaki *et al*., 2012). However, only a few studies have attempted to evaluate the impact of various intervention strategies on mitigating these difficulties (NRC, 2001). Among these studies, the majority have evidenced only limited success with applying various intervention styles. This might be caused by their focus on trying to change the children's behaviour, as opposed to attempting to shape the behaviour of adults into a form more suitable for interacting with autistic children (Bradshaw, 1998; Kossyvaki *et al*., 2014). Supporting this assumption is an argument stated in Prizant *et al*. (2006) that the main responsibility for the limited communication skills of autistic children is borne by adults, and particularly their way of interacting with these children. It is therefore apparent that to be effective, interventions need to take into account the importance of employing an appropriate interaction style.

This thesis therefore draws upon the transactional model of child development, which proposes that the development of the child can be influenced by the behaviour of adults (Wetherby and Prizant, 2000), and that the adults should accept the same, or more, responsibility for the success or breakdown of the adult-child communication (Willis and Robinson, 2011). Since it was first proposed in 1975 (Sameroff, 1975), the transactional model has provided a way through the 'nature or nurture' debate, and has been used to

underpin research on areas such as the development of self-regulation by children and the impact on this process of their interactions with parents and, later, teachers and other children (Sameroff, 2009). Subsequent research has found clear evidence that the child is an active player in an active environment, which includes parents, siblings, teachers, and other children, and that there are bidirectional effects that occur due to transactions between these agents (Patterson and Fisher, 2002). Communication between adults and children is one such transaction, and therefore a useful activity to target for intervention.

The transactional model has its roots in Jerome Bruner's work in cognitive psychology on the topic of perception and social interaction. Bruner conceptualised gaze interactions between mother and infant pairs as joint actions, and also drew attention to the psychological impact of culture (and especially of representational communication systems in a culture, such as spoken language). In this work he drew heavily on the theories of Lev Vygotsky, who had focused on social and communal influences on child development. Vygotsky believed that language and communication had their roots in a gradual process of the child internalising external signs that were presented in the child's social environment, e.g. through interactions with parents, peers and teachers (Boden, 2006). Bruner's ideas were further developed by Colwyn Trevarthen, who placed intersubjective transactions between infants and parents as crucial to pre-linguistic development as well (Conkbayir and Pascal, 2015.)

2.4.2 Developmental/relational models of autism

The view of child development offered by the transactional model is embraced by developmental/relationship based approaches to autism, which hold that addressing

developmental disability must include attention to how communication and social interaction develops in the context of relationships with others. The developmental/relationship approach to intervention has, therefore, been adopted by this research as a foundation for developing and applying AISI within the Saudi Arabian context. For instance, the child cannot be expected to initiate communication if the adult fails to wait for a sufficient period of time, or if the adult speaks for an excessive length of time. In this type of situation, the child may not initiate communication because they were not given the chance to do so, rather than due to not being able to initiate communication. Also, the child may be discouraged from initiating communication if the adult deems their communicative initiation to be inappropriate and so does not respond to it.

2.4.3 The social model of disability

The social model of disability is the second theoretical framework to be adopted by this thesis, and it is compatible with the transactional model of child development. The social model of disability argues that the failure of the environment to accommodate an individual's difficulties will result in disability. By contrast, the medical model states that the individual should be treated and adapted to a society that is pre-determined and set (Rieser and Mason, 1990). The medical model has even been used to compare autism to AIDS and cancer, in pleas for extra funding to enable a cure to be found for autism (Llaneza *et al*., 2010).

As Barnes and Mercer (2004) have noted, the social model was developed to challenge orthodoxies that placed people with disability labels as always in need of treatment, care and control by non-disabled people. Further development of the social model has included

giving more attention to the impacts of impairments, and consideration of how cultures create and interpret disability labels (Abberley, 1987; Oliver, 1996). As Bricout *et al*. (2004) point out, the model of disability chosen by parents and professionals refers to a framework of ideas about the causes of disabilities and the correct response to disabilities. They argue that for people with developmental disabilities such as autism, *"while the medical model has a place in the intervention process, it is not a panacea"* (*ibid*.: p. 58). They suggest giving greater attention to the social environment of disabled children, including barriers to, and promoters of, participation and communication, as these factors may be more amenable to change than children themselves.

This thesis argues that the individuality of an autistic child is likely to be lost to stereotypical generalisations, if a medical diagnosis is applied to that child and followed only by medical or educational interventions aimed at making the child behave like a typically developing child. In accordance with the social model of disability, difficulties often stem from outside the child, such as disabling environments, and many are constructed socially (Tregaskis, 2002). The implication drawn is that adults should support the autistic child by providing environments, methods and situations that are conducive to initiating communication.

The promotion of self-advocacy by autistic individuals is incorporated within the social model of disability, and this is supported by this thesis. Teaching self-advocacy begins with making choices (such as for activities, chores and meals) and it is believed that assisting in developing a sense of self in later life can be helped if communicative initiation is encouraged through facilitating requesting, speaking up for one's self, negotiating, recognising responsibilities and rights, and making use of resources. Through developing

communication skills that underpin self-advocacy, disabled people become more able to recognise and address barriers themselves or through requests to others.

The social model can be interpreted as ignoring the impact of impairment (Shakespeare, 2002), although even its critics acknowledge that for most disabled people, it provides a useful framework for promoting change at the systems level and positive identity formation (*ibid*.) Certainly in the case of autism, there is a strong argument to be made that:

> *"…autism is intrinsically a relational phenomenon, a function of the interaction between people. In that sense, autism is a social/cultural phenomenon, not located within individuals but rather in the connections between individuals in a community"* (Straus, in Lennard, 2013: p. 466).

The bio-psycho-social (BPS) model of disability has been posited by some as an alternative to both the medical model's clear limitations and the social model's supposed lack of attention to the medical or bodily aspects of disability. However, this model has come under sustained fire in recent years for its lack of a rigourous research base and its misuse in political debates about disability and disability benefits. The name is derived from the work of neurologist Roy Grinker (1964), and concepts were further developed by gastroenterologist George Engel (1977, 1980) (Interestingly, Grinker's grandson, neuroanthropologist Roy Grinker Jr., is one of the best-known current proponents of a social-model approach to autism). Engel codified something that perhaps all good doctors had long known, that health problems do not exist apart from patients and their environment, so how a patient views his or her condition and how those around the patient deal with it will have an impact on the condition's progress. Moving on from that, to have the greatest positive impact, doctors should not only apply the correct medical treatment,

but consider how to support good psychological adjustment and ensure that the patient is appropriately supported and does not face negative attitudes or other barriers that cause additional problems (*ibid*.).

This appears to be a useful, holistic approach to medical issues, and it has certainly been adopted by physicians and made an impact in psychology and patient support—one could even see Engel's work as providing some early underpinning to development of the social model of disability. However, Shakespeare, Watson and Alghaib's 2016 examination of the bio-psycho-social model as it is used today notes that "*although influential and widely cited, Engel's biopsychosocial model was never properly defined or adequately described. The original Engel model is neither based on an underlying theory, nor is it testable empirically: it does not explore the nature of the interaction between the biological, psychological and social levels*" (*ibid*.) For these British disability researchers, the elaborated version of the BPS model adopted by Gordon Waddel and Mansel Aylward at the Centre for Psychosocial and Disability Research, Cardiff University, a unit working under contract with the UK Department for Work and Pensions, posed particular issues. It had been used to develop concepts that would remove disabled people from disability benefits and facilitate their return to paid employment. Shakespeare, Watson and Alghaib write:

> *"Rather than bringing together biological, psychological and social factors in a holistic account of disability, the Waddell-Aylward BPS is in actuality a causal explanation of sickness absence, with advocacy for a particular approach to disability management. By saying that the social model is not relevant to this population, and by differentiating 'common conditions' from*

> *'severe conditions,' advocates of the Waddell-Aylward BPS are advancing a distinction between 'real' incapacity benefit claimants, with long-term and incurable health conditions, and 'fake' benefit claimants, with short-term illness."* (*ibid*.)

One can derive from this that the Waddell-Aylward bio-psycho-social model had not been designed for applicability in school settings, for children too young to have developed any particular attitude toward their diagnostic label, or for people with lifelong, incurable health conditions, a category that is usually defined as including autism. Shakespeare goes on to reveal numerous unsupported claims in Waddell and Aylward's key papers, providing further reasons to not rely on a theoretical framework that appears to be based on shaky and insufficient evidence (*ibid*.). Similar questions have been raised by Nassir Ghaemi (2010), who also critiques the limitations of Engel's work and that of his followers. Benning (2015) considers the evidence for a large number of recent critical appraisals of the BPS model, which he concludes has "significant limitations." For example, he writes, the BPS model minimises the role of social conditions and environment in producing disability, but as noted elsewhere in this chapter, much current research in autism, and the personal testimonies of people with autism, highlight the fact that enabling or disabling environments play a crucial part in individuals' ability to function optimally and learn.

If one leaves aside the Waddell and Aylward variation and returns to the original Engel BPS model, his work was focused on taking a holistic view of adult medical conditions such as heart problems, not childhood developmental disorders. However, some researchers have attempted to apply Engel's BPS model to autism in ways that essentially use it as a method of medicalisation. For example, Silva *et al*. (2013) claim to have used the BPS

model in an analysis of brain imaging studies and cognitive theories in autism, but present no data about individual psychological adjustment or the impact of social barriers or conditions. This study is one of several that gives lip service to the BPS model without taking up Engel's challenge.

Other researchers have used the concept in a more useful way—for example, Griffiths, Gardner and Nugent (1998) used Engel's BPS model as a way to expand the concept of functional behaviour analysis (a concept that derived from behaviourism) to include psychological factors such as anxiety and medical issues such as Fragile X syndrome when trying to understand complex behaviours. They pointed out that a variety of factors may have direct impact on behaviour, or secondary impact by affecting other factors. In addition, they were particularly concerned with ensuring that medications and behavioural procedures were not misused. This was of course an important improvement on the reductionism that characterised "pure" behaviourist approaches in autism. These authors called for use of a biopsychosocial multimodal plan, which might include not just behaviourist responses, such as reinforcing desirable behaviours, but also making an effort to understand how a child's anxiety or low cognitive ability impacts a target behaviour, and how manipulating situations or environments could also make a difference.

Due to the strong criticisms applied by many to the BPS model and its weak applicability in the setting of this research, this model was not employed. First, while it can be argued that because a medical diagnosis of autism is required to attend the school programme researched in this study, there is a biological element to the model used, it is not possible for teaching staff to make medical diagnoses or apply medical treatments. Understandings of autism derived from medical diagnosis are useful, and staff may contribute to medical

treatment by giving prescribed medicine or reporting symptoms they observe to clinicians, but this was not the focus of this research. Second, young children (and especially non-verbal children, like most of those in the group researched in this study) cannot report on their psychological adjustment or take part in discussion-based psychological therapies. However, staff can gain clues through observation of behaviour and affect, and can support healthy adjustments through relationship-based strategies. Accordingly, the developmental/relational model of autism and the social model of disability appear to be the most relevant theoretical positions for the design of this particular research and for the interpretation of its results. These theoretical positions provide a clear rationale for approaches that focus on the role of adults in promotion of communication. The author does not, however, argue that these are the only valid positions to take or that these models account for all aspects of autism. In clinical settings, in work with older children or adults, and in cases where autism is combined with additional health problems or when medications are already being used, increased attention to biological investigation may be usefully combined with psychological and social approaches in ways that resemble the Engel's biopsychosocial model.

2.5 Theoretical background of the Adult Interactive Style Intervention

Having detailed the theoretical framework of this thesis, the aim of the following section is to discuss additional theories of social communication with relevance to this thesis. The Adult Interactive Style Intervention (AISI) concept was originally developed by Lila Kossyvaki, during research conducted for her PhD (Kossyvaki, 2013). Kossyvaki piloted the concept in an Early Years foundation setting in the UK, with a focus on the impact of changes in teachers' communication style on the communicative output of very young

autistic children (Kossyvaki, Jones and Guldberg, 2012; Kossyvaki, Jones and Guldberg, 2014). This research found that implementing an AISI resulted in a significant increase in children's frequency of spontaneous communication, and a follow-up study found that these changes were maintained over time. She has also researched the ability of staff to successfully change their behaviour, and to maintain these changes over time.

AISI is therefore a relatively new intervention, with an initial evidence base developed by the same team that had designed the intervention. For this reason, additional investigation was needed by other researchers, in different settings, and with children who have different characteristics. The research carried out for this study will contribute to this need by trialing the AISI, including an additional AISI principle, with older children (age 5-7 years rather than preschool children) with a different cultural and linguistic background, in a different school setting outside the UK. Changes were also made to the researcher role in the action research design.

Kossyvaki's work built upon a range of cognitive and hyper-sensitivity theories that have been used to explain the behaviours and cognitive style associated with the autism spectrum. Although these theories consider primarily within-child factors, understanding cognitive style and sensory perceptual differences associated with autism is a prerequisite to successful implementation of any intervention, including one focused on adult behaviour. The following sub-sections provide background information and critical perspectives on these theories.

2.5.1 Theory of Mind (ToM)

Research in psychology and language development has focused considerably on how ToM and related developmental tasks are handled by children. The way that non-autistic children perform on classic ToM tasks provides insights into the development of social intuition. It reflects the conceptual knowledge of mental conditions, along with general cognitive skills that facilitate the inhibition of spontaneous responses, memory of key narrative events and verbal processing that are at the core of cognitive tasks (Ozonoff *et al.*, 2004).

Baron-Cohen (1995) asserted that poor Theory of Mind (ToM) or 'mind-blindness' is an inherent aspect of autism, because autistic children are less able to predict the behaviour of others, placing them at a disadvantage. Other studies of autistic children suggest that they treat ToM tasks as logical reasoning problems, with a major focus on non-social cognitive processes and language instead of social insight.

According to Ozonoff *et al*. (2004), executive function differences (see *Section 2.5.3*) are often observed in autistic children when tasks require working memory, flexibility and planning, together with inhibitory control, which affects ToM task performance. Hadjikhani *et al*. (2004) believe that the way autistic children and typically developing children perform on false-belief tasks is linked to executive control actions. It is more likely that children with better inhibitory control and planning skills will perform false-belief tasks successfully.

Astington and Baird (2005) observed a close link between the development of ToM skills

and language ability. Autistic children, if they can communicate verbally at all, usually acquire language later, and typically fall behind peers in basic linguistic ability. Children with autism who develop language at the usual age will nonetheless display functional communication deficits, such as difficulty with pragmatics or with using speech interactively. Though some autistic children are able to pass ToM tasks, social 'intuition' may still be lacking. Klin *et al.* (2003), among others, have explored mental state understanding beyond naturalistic social settings in order to investigate spontaneous processing of mental state information through communication. A widening in scope of mechanisms central to the symptoms of autism include responses to, and perceptions of, a broad array of social stimuli.

The design of an AISI should therefore consider differences in autistic children's capacity to recognise, and their tendency to not apply, emotions, needs and thoughts to others or themselves. The success of communication depends upon the message receiver's emotions, needs and thoughts being recognised by the message sender. Therefore, adults should endeavour to change the communication environment, including their own responses, to encourage and facilitate spontaneous communication, rather than attempting to change the child. This, in turn, raises issues related to subjectivity, which are discussed later in this literature review.

2.5.2 Central Coherence

Autistic individuals usually contextualise information as pieces that are disconnected and narrowly collected, as opposed to neurotypical individuals, who are able to reference a relatively wide range of information (Frith, 2003). This method of narrowly sorting

information is referred to as underdeveloped 'central coherence.' Although its prevalence has not yet been determined, Happé (1997) and a few writers, including Jarrold and Russell (1997), have rejected this argument. However, it can be argued that if present, cognitive impairment has a negative influence on the ability of autistic individuals to contextualise information (Frith, 2003). As all conversations are unavoidably different from one another, and because communication involves continual changes in topics, objectives and tone, it follows that individuals with underdeveloped or impaired central coherence will find the process of communication complex (Noens and Van Berckelaer-Onnes, 2004).

The theory of central coherence has implications for the creation of an AISI to facilitate spontaneous communication because it must be borne in mind that autistic people do not usually process information in context and globally. Therefore, when designing an AISI that is aimed at eliciting and initiating communication from the child, consideration should be given to the tendency of autistic children to process information in a fragmentary manner and locally (Frith, 2003). Adults should adapt their communication style to support children to move towards global processing by, for example, communicating explicitly how items of information are connected.

2.5.3 Executive Functioning

Executive Functioning (EF) is an umbrella term covering creation of productive and adaptive behaviours, especially under circumstances that are extreme or unfamiliar (Pellicano, 2011). Hill (2004) explains that EF covers many processes, such as cognitive adaptability, memory, self-restraint, sequencing and flexibility, among which cognitive adaptability is especially important for helping autistic children improve their interactive

skills. Those who struggle with EF find it extremely difficult to formulate responses for a conversation that is continually changing, thereby making interpersonal communication problematic. Deficiencies in EF skills are exhibited by an overwhelming majority of autistic individuals (Pennington and Ozonoff, 1996). Deficiencies in the application of EF functions can cause difficulties in initiating conversation, including making simple requests, the difficulty increasing with less familiar environments compared to the individuals' home (Pellicano, 2011). Structuring conversation also tends to be problematic for autistic children. They may struggle to sustain a conversation to a logical conclusion, and have problems mentally adjusting to the rhythmic changes of conversations.

Since communicative flexibility, adaptability to different situations and knowing how to respond in various contexts are all associated with effective communication, the EF theory suggests that initiation of communication will tend to be difficult for autistic children. Effective AISI design, to encourage and facilitate spontaneous communication in young autistic people, should take into account their difficulties with EF tasks. The design should attempt to assist children in attaining a level of self-awareness in monitoring their own actions, in turn assisting them to become more competent communicators. EF theory design should also recognise sequencing and planning difficulties in autistic children, which cause processing delays in communicative ability: initiating, maintaining and finishing a conversation. Adults must provide additional response time and to be attentive to all response forms.

2.5.4 Monotropic focus and Single Attention and Associated Cognition in Autism

Monotropic focus, also known as Single Attention and Associated Cognition in Autism (SAACA), refers to attempts to explain the processes that drive the behaviours of autistic individuals (Lawson, 2011). In particular, 'single attention' relates to the difficulty autistic individuals have in engaging with more than one single piece of information at any one time (Lawson, 2001). This has been described by Mesibov (2007) as comparable to a single beam of light, which is bright but restricted. Surrounding factors that can also provide social cues or context to communication, such as changes in facial expressions or in tone of voice, are often ignored when processing information this way. The result is that the responses of autistic individuals can be unconventional, and they may have difficulty in changing their focus quickly between tasks, thereby appearing out of sync and awkward when interacting (Courchesne *et al*., 1994).

Monotropic focus theory implies that AISI design should take into account the difficulties autistic people have in focusing on more than one information channel at a time, in order to filter information. This theory notes autistic people's tendency to shift their attention slowly between different activities. Their attempts at communicative initiation, requesting or commenting may be delayed, and seem to be out of context. To gain the attention of autistic children, the intervention design should incorporate the use of information, topics and communicative expressions that are of interest to the particular child.

2.5.5 Differences in sensory processing

Studies have shown that autistic individuals are typically hyper-sensitive to sensory intrusions and stimuli, including hypersensitivity when exposed to sound, tastes, touch,

smells, light and colour (Lord, 2010; Myles *et al*., 2000). This has a significant influence on how an autistic individual interacts with his or her environment, including with people during communicative interactions. This information would suggest that an individual's hypersensitivities must be considered before any interventional or educational action takes place. Addressing hypersensitivity (or hyposensitivity, which affects some) can contribute to programme's effectiveness, as well as acting as a precautionary safeguard (Dunn *et al*., 2002). An AISI designed to encourage and facilitate spontaneous communication by autistic children should take account of the likelihood that autistic children's ability to initiate communication will be influenced by differences in sensory processing. For instance, a child with visual hypersensitivity may get close to an adult prior to initiating communication. On the other hand, a child with auditory hypersensitivity might refuse to communicate with an adult who speaks in a loud voice. Sensory perceptual differences can also include hyposensitivity to further stimuli, changing sensory perceptual experiences due to factors such as stress.

2.5.6 Inter-subjectivity and enabling communication

Most cognitive and sensory-perceptual theories of autism described so far in this chapter have been developed using a medical model of autism, which presumes that the differences described in autistic people represent deficiencies within the autistic person. In fact, it is impossible to describe the theories without using the language of 'deficiency,' because cognitive theories in particular are based on the idea that there is a norm against which those with cognitive differences can and should be compared. These theories are constructed in a way that seems to propose that the logical step for those seeking to assist autistic people is to remedy deficiencies through interventions targeted at the person with

autism. However, as will be discussed in greater detail in another section of this literature review, communication is an interpersonal phenomenon, so when an individual experiences difficulties with communication, the 'problem' cannot simply be put down to a differences in one of the people interacting.

For example, Dant (2015: p. 46), in a critique of the ToM approach to autism, writes: *"despite the accumulation of scientifically respectable evidence that appears to provide some support for the Theory of Mind, it has not provided a useful understanding of what autism is or a strategy to respond to its experiences."* Dant proposes that the theory of inter-subjectivity is more suitable for attempting to understand autistic people's difficulties, because it focuses on the idea that successful communication and understanding others as individuals will depend upon us knowing what is in their minds. Through a discussion of five processes of inter-subjectivity (co-presence, apperception, empathy, the look, and communicative interaction) Dant (*ibid*.: p. 45) claims successful communication occurs because *"we draw on information about their expressive body and our own previous experiences to impute a feeling or infer a response to another person."*

Kumar (2014) also highlights the relevance of the inter-subjectivity theory by stating that autistic people will have difficulties interpreting body language and learning from experiences of emotions and feelings:

> *"An autistic mind can operate in different domains, including those of mechanical action and interactive socialisation, but not at all or not well in that of intersubjective socialisation. The missing link is intersubjective interpretation. As a result, the autistic mind fails to develop normal meta-mentation. Meta-mental means about mental or thinking reflexively. Failures*

> *in communication are apt to resurface as failures of meta-mentation, not because communication shapes meta-mentation but because the design of both abilities is indebted to intersubjective interpretation."* (*ibid*.: p. 5)

The autistic person's lack of intersubjective interpretation is said to adversely affect their ability to socialise and think flexibly. This can also be turned around by noting that non-autistic communication partners may also adversely affect communicative interactions by not providing the extra information needed to support intersubjective interpretation by other, 'non-intuitive' means.

Hobson *et al*. (2006) studied a sample of 12 autistic children and adolescents (plus a sample of 12 TD children and adolescents for the purposes of comparative analysis) in order to investigate a possible correlation between autism and deficiencies in intersubjective engagement. The study particularly investigated nonverbal communication with a focus on affective engagement, where *"affective engagement was defined as the degree of emotional connectedness between the participant and the experimenter, and was rated using a one-to-five point scale"* (*ibid*.: p. 5). The results showed there were significant differences between the autistic sample and the TD sample, with *"significantly less affective engagement between the interviewer and those participants who had autism."* (*ibid*.: p. 8). These findings suggest potential differences in autistic children's and adolescents' capacity for intersubjective engagement, and differences in the ability of interviewers to adapt to these differences.

Further, Hiddinga *et al*. (2012: p. 39) write that *"children with autism lack Köhler's phenomenon (the ability to recognize people's intentions and feelings on the basis of bodily expressions and movements) not because they lack a Theory of Mind, but because they didn't experience a Vygotskyan process of socialization – internalizing relationships, due to their innate difference in interaction to surrounding neurotypicals."* This claim, that autistic individuals' difficulties with intersubjective interpretation and engagement stem from their different interaction style to TD people, is interesting. It implies that the design of an AISI needs to encourage spontaneous communication by seeking to interact in similar ways to autistic children, perhaps by imitating their communicative initiations in order to attain engagement with them and build a relationship.

Potter and Whittaker (2001) feel it is important to help autistic children develop spontaneous communication as a fundamental part of being able to convey wants and needs, exert some control over their lives, and enable their participation in social interactions. After a study of five special schools in the UK over a two-year period, these authors developed the concept of 'enabling environments', to assist school staff to enable communication with autistic children who use little or no speech. Importantly, the authors found that the implementation of approaches and strategies that were communication-enabling, and that were based upon the strengths of the children, enabled autistic children who use little or no speech to make good progress in their communication and social abilities. The study also found that environmental factors, as opposed to those within the children, influenced the quality and the rate of their spontaneous communication (Potter and Whittaker, 2001). AISI can be seen as an element of an enabling environment as it addresses the contribution of adults to communication and interaction.

2.5.7 Summary and implications of theoretical framework

This section concludes with a summary of the theoretical framework that guided the research for this thesis, and a discussion of the implications of this framework with respect to the design of an AISI. During this discussion, references will be made to the theories previously reviewed in order to justify the selection of an appropriate theoretical framework upon which the design of an AISI will be established.

As explained previously, this thesis draws upon the transactional model of child development, in that children's development can be influenced by the adult behaviour (Wetherby and Prizant, 2000) and that the adults should accept the same, or more, responsibility for the success or breakdown of the adult-child communication (Willis and Robinson, 2011). The transactional model implies the intervention with either or both communication partners will have an impact. In an AISI design, adults are the intervention focus. They should: wait, to provide the child sufficient time to process information and initiate communication; minimise the amount of speech, to avoid confusion and disengagement in the child; and respond to any communicative attempts of the child, even sounds and actions they do not understand, to show that they are listening.

The social model of disability is the second theoretical framework adopted by this thesis. It states that the failure of the environment to allow for an individual's impairments or differences results in disability. If society can adjust to impairments and differences, individuals can develop, learn, and enjoy good lives, even if no medical treatment is effective (as in the case of autism). AISI intervention provides a way to change the

communicative environment for autistic children, removing communication barriers to create environments that encourage communication. It encourages staff to create conditions in which autistic children are better able to use and develop the communication skills they do have.

Self-advocacy by autistic individuals is promoted within the social model of disability, and supported by this thesis. Self-advocacy begins with making choices, so AISI design should incorporate adults offering choices to the child. Potter and Whittaker (2001) suggest a focus on environmental factors to provide approaches and strategies that are communication-enabling. Particularly relevant to this AISI design is their suggestion for building upon the autistic child's strengths and attainment of joint eye contact through interactive, object-free games with familiar adults (Potter and Whittaker, 2001).

ToM has relevance for AISI, because it suggests that adults should be instructed to facilitate recognition through exaggerated facial expressions, vocal pitch, gesturing and body language. In contrast, writers like Kumar (2014) have drawn attention to the relevance of intersubjectivity theory to challenge ToM as a way of explaining the difficulties that autistic people experience in interpreting body language and learning from experiences of emotions and feelings. Hiddinga *et al*. (2012) argue that the autistic person's difficulty with intersubjective interpretation and engagement stems from their differences to TD people in their ways of interacting, which then impact how others react to and communicate with them. Therefore, AISI design must involve useful components, such as adults mimicking autistic children's communicative initiations to facilitate interaction, engagement and relationship-building opportunities.

The theory of central coherence claims autistic people do not usually process information in context and globally. This tendency of autistic children to process information in a fragmentary manner and locally (Frith, 2003) again suggests the need to incorporate minimal speech from the adult within the design of an AISI. The potential presence of executive functioning deficits implies that adults should assist the child in attaining a level of self-awareness in monitoring their own actions, for example through commenting and mimicking. The theory of executive functioning also shows that the designer of the intervention should recognise that autistic children often have difficulties with regards to sequencing and planning, suggesting processing delays in their communicative ability to initiate, maintain and finish a conversation. Therefore, adult waiting can again be highlighted for inclusion within an AISI.

The theory of monotropic focus suggests that the designer of an AISI should take into account the difficulties that autistic children have in focusing on more than one thing at a time, including their attention difficulties. Thus, the adult should be directed towards gaining the attention of the child by removing distractions and utilising information, topics and communicative expressions that are of interest to the child. The theory of monotropic focus also reinforces the idea of the adult providing sufficient waiting time for the child to respond, because it highlights the autistic child's tendency to shift their attention slowly between different activities.

Finally, theories regarding differences in sensory processing suggest that an individual's hypersensitivities must be considered before any interventional or educational action takes

place, thereby contributing towards the programme's effectiveness, as well as acting as a precautionary safeguard (Dunn *et al*., 2002). Therefore, adults should understand the importance of appropriate proximity, vocal volume and pitch, and touch, because it is likely that autistic children's ability to initiate communication will be influenced by their differences in sensory processing.

Although these theories have all contributed to the design of AISI, there are as noted contradictions between them, and these are reflected in the design of AISI, which can be adapted to the needs of individual children. Practitioners should be aware that some AISI recommendations could contribute to sensory overload, for example, and it could be argued that tactics like exaggerated pitch or facial expressions could detract from understanding or not add value if a child is processing information monotropically. AISI does not include provisions that expressly address ToM by providing the 'missing information' children might need, and adding extra structure to address central coherence or executive functioning differences is not part of the intervention.

No single theory, and no single intervention, can hope to address all aspects of communication in autism. AISI should be regarded as one tool that can be used, and should always be adapted to fit the profile of the individual child.

2.6. Social communication in child development

This section presents a review of additional literature that underpins the implementation of the Adult Interactive Style Intervention (AISI) used in this research. In this research, the

AISI approach is intended to assist in facilitating spontaneous communication from autistic children. The following sequencing has been adopted to ensure that relevant literature is considered. First, the definition of autism used in this research is presented. Second, literature regarding the development of social communication by both typically developing children and children with autism will be examined in order to illustrate significant developmental differences. Thirdly, a review of literature on intentional spontaneous social communication in children has been conducted. This specific form of communication, which appears to be problematic for children with autism, is the target of the AISI documented by this thesis. Fourth, communicative functions, methods and issues are discussed, so as to provide the reader with an understanding of why and how children with autism communicate. Fifth, a critical review of a variety of interventions that purport to foster spontaneous communication is presented. This will illustrate how the 22 AISI principles, that were utilised in the research methodology described in this thesis, were derived from existing research. It will be shown that although some of these AISI principles came from naturalist behavioural interventions, the majority were generated from developmental/relationship-based approaches.

Although there is considerable overlap between the AISI principles used in this research and those used in Kossyvaki's research, this is not a replication study. This research concerned specific children and the staff working with them, and was carried out in Saudi Arabia. The children were older than those in Kossyvaki's study (ages 5-7 rather than under age 5) and had experienced a different cultural and linguistic environment in which to develop and learn. Child-specific, staff-specific and cultural factors will all have impact on the AISI principles that are chosen and that are efficacious in any setting. For example, the AISI principles used in this study are appropriate for adults working with young

children at a very early stage of their communication development. These principles would have to be adapted for use with more able children who have more communicative ability. However, as with Intensive Interaction (Nind, 1999; Nind and Hewitt, 2001; Furby and Catlow, 2016), these methods may prove to be effective with older children and adults whose developmental and communication level is similar to the young children researched in this study and the younger group researched by Kossyvaki *et al*. (*ibid*.)

Deeper discussion with and advice from Kossyvaki, who originally developed the AISI, led to further ideas about how best to implement the AISI principles in a Saudi Arabian context and with a focus on eliciting spontaneous communication. The principles were further developed through working with staff using an action research methodology during this research, as will be discussed in subsequent chapters.

2.6.1 Autism

Autism is defined internationally as a lifelong neurodevelopmental condition. According to Kang-Yi *et al*. (2015), autism is characterised by impairments in social communication and interaction, and the display of restricted interests. Individuals with autism all present difficulties with social and emotional understanding, the understanding and use of language and communication, and rigidity of thought and behaviour (Wing, 1996). The extent and nature of this pattern of impairments varies between children, and persists across the lifespan. Additional difficulties are often reported, which may be related to autism or may represent additional co-morbid conditions. These include intellectual disabilities, difficulties with sleep and eating, and challenging behaviour, including self-injurious behaviour.

According to the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (*DSM-V*) (American Psychiatric Association, 2013), autistic spectrum disorders are indicated by major and pervasive impairment of multiple areas of development, including difficulties in two-way social interaction, difficulties in communication, and the presentation of stereotyped behaviour and interests. Subgroups and differing causes may exist within this set of commonalities (Grzadzinski *et al*., 2013). The key effect in autism is its direct impact on reciprocal social communication skills, which causes difficulty in understanding concepts, challenges in interpreting what other people think or feel, and difficulties in identifying and using social cues, such as eye contact (Taylor *et al*., 2013).

As noted in the preceding chapter, however, it must also be acknowledged that any discussion of 'impairment' in autism needs to be accompanied by an understanding that this impairment may only exist in disabling environments, and that it is interactional in nature.

2.6.2 Autism and social communication

This section investigates various definitions for communication and social communication, prior to offering the definitions to be utilised in this thesis. Communication skills allow children to relate to others as well as to attain a degree of control over their environment (Buckley, 2003). Communication can be defined generally as the transfer of information between two or more individuals through means that may be verbal or non-verbal.

In the context of autism research, it has been stated by Bogdashina (2005) that communication is either transmitted (expressive) or received (receptive). She further states that for a communicative act to occur, there must be: (1) a message to communicate; (2)

someone sending the message; (3) someone receiving the message; (4) a transmission medium and (5) an intention to communicate (*ibid*.). Prizant *et al.* (2000) suggest three main types of communicative functions: *behaviour regulation* (such as requesting and protesting), *joint attention* (such as commenting and providing information), and *social interaction* (such as greeting, attracting attention, and participating in social routines and games).

The means of communication can then be divided into linguistic means, such as spoken, written or sign language; and non-linguistic means, including body language, gesturing, and facial expressions, as well as the use of various symbols and images (Bogdashina, *op cit*.). It should also be recognised that intention is not *always* present in communication, and that a variety of means may be used to communicate a single message (Messer, 1994). The issue of intentionality will be defined and examined in a later section of this Literature Review.

In order to define and clarify *social communication*, it should be noted that the term is used in this thesis to refer to communication in the context of social interaction. This corresponds to the definition of communication used in the *DSM-V* when discussing communication differences in autism, where it is stated that individuals with autism may experience difficulties in verbal as well as non-verbal communication, in the development and maintenance of relationships, in emotional reciprocity, and in social interaction, all of which can be classified as aspects of social communication (Lord, 2010).

The definition of *spontaneity* in communication as a construct is varied (Ivery, 2009). Many definitions associate the term with antecedents eliciting a spontaneous response. According to Buck and Van Lear (2002), spontaneous communication as a non-voluntary,

non-propositional process based on a biologically shared system wherein the elements of a given message are signs rather than signals. They state that displays of spontaneous communication include facial expression, gestures, micro-movements, vocalisation, pheromones and postures. Stone and Caro-Martinez (1990) and Carter and Hotchkis (2002) define spontaneous communication as a communication pattern initiated by a child in a non-elicited manner, excluding responses to questions. Watson *et al*. (1989), on the other hand, argue that spontaneous communication is elicited by the environment and cannot be prompted. Spontaneous communication allows individuals to communicate their needs when required and provides learners with the ability to control their environment.

From these definitions of spontaneity and its role, this research will adopt the definition according to Duffy and Healy (2011), where spontaneous communication is defined as communication presented when there may be external or environmental stimuli, such as prompts, instructions and verbal cues. This definition of spontaneity is applicable to the current thesis because it helps in understanding the need for clear and concise interactive communication development, and can be defined along with the particular antecedents required to gain insight into the functionality of communication patterns.

2.6.3 Social communication in typical development

This section discusses the development of social communication in typically developing (TD) children, to permit contextual analysis of the ways that the development of social communication skills by children with autism may be atypical.

There is much variation in the development of TD children due to issues such as personal experiences and environmental and biological factors (Sheridan, 2008). Nonetheless, from the earliest days after birth, infants attempt to build emotional links to carers via facial

expressions and eye contact. Similarly, they soon respond to a gentle voice and smile. By six months, TD children may be able to recognise different voice tones, vocalise to others, and keep eye contact. Infants at this age may also demonstrate emotions and react positively to games they recognise from repetition. By nine months, they can seek attention by communicating through deliberate babbling and respond when their name is spoken. Responses may also be given through imitation of hand-waving and hand-clapping, as well as imitation of facial expressions.

By twelve months, most TD children can follow gestures and an adult's eye direction in order to understand basic instructions, point to things, and make requests. They also show affection and awareness to others, and display a range of different emotions. Their babbling starts to resemble a form of speech (*ibid*.).

By two years old, TD toddlers may utilise around 50 words correctly and create simple sentences. At this stage, they refer to themselves by their name, know the names of many people and objects, can gain the attention of carers, can join in games, and might have tantrums when unable to use communication effectively.

By three years old, TD toddlers have usually attained a significant vocabulary, and can ask a great variety of questions. At age four, the speech of the TD child is clearly intelligible and for the most part grammatically correct, showing an awareness of tenses. Speech is used to express empathy, sympathy and distress. By age five, it is expected that TD children can speak fluently, using sentences that are grammatically as well as phonetically correct. They can also understand sequencing and time, and play cooperatively with peers in imaginative ways (*ibid*.).

The general consensus is that the child's communicative development depends upon their environment, and that the adult carer is the most important aspect of that environment (for example, Olson *et al*., 1986; Jarvis and Lamb, 2001). However, social communication problems may arise if the parents are depressed and/or show a lack of affection to the child (Wetherby and Prizant, 2002).

According to Sheridan (*op cit*.), child development is a dynamic process, and achievement of specific developmental milestones is linked to genetic factors, environmental factors, and personal experiences. Therefore, as Luyster *et al*. (2005) argue, there can be variability in the pattern of development of social communication amongst TD children. These authors also argue that the development of social communication skills requires the ability to share a focus on specific events or objects with others (peers, parents, teachers and other adult carers). Such an ability to focus therefore transforms social communicative acts, including joint attention skills, to establish a shared focus with their social partners.

Communicative behaviour also involves non-verbal communication, often exhibited from birth through actions such as reaching (Inge *et al*., 1981). During the developmental process, the sophistication of requests by the child continues to grow, and a hierarchy of communicative forms is created. Infants move from pre-linguistic to linguistic requests (Bates *et al*., 1989). Pre-linguistic requests, often referred to as generalised or non-referential requests, are ambiguous, because they generate similar behavioural patterns for a range of meanings (Knapp, 2012). In comparison, linguistic requests, or referential requests, are specific in nature, where the link is made to a specific referent and lends itself to unambiguous interpretation. Referential requests are developed by the child around the age of 13 months, when the child learns to use specific sounds or gestures in response to particular stimuli (Matthews *et al*., 2012; Yule, 1997).

From the evidence outlined above, one can argue that social communication between young children and their caregivers is constantly transforming as the child gains new skills. Two key changes include the development of joint attention, followed by the child's intent to learn language and symbols that can then be fused with their joint engagement capabilities. Although this section has discussed typical developmental stages, individual developmental trajectories may vary regarding the age at which certain communication skills are gained. Development can be affected by external factors, such as parenting style and the culture in which the child learns to communicate, or internal factors, such as the presence of hearing impairment or physical difficulties with producing speech sounds or gestures. Therefore, a relatively wide range of individual and cultural variations can fall under the umbrella of 'normal' development of social communication

2.6.4 Social communication in autism

Children with autism who learn communication skills usually go through the same phases of development as TD children. However, these phases are found to develop at different rates for different children (Bates and Dick, 2002). Efforts have been made over the last few decades to understand the difficulties associated with the social communication process of children with autism (Thiemann and Goldstein, 2001; Lord *et al*., 2000; Stephens, 2011), a difficult task due to the wide varation between children with autism (Thurm *et al*., 2007; Kjelgaard and Tager-Flusberg, 2001) and, potentially, different etiologies for autism.

While individuals with autism may have a range of language abilities, all autistic children have some degree of impairment with social communication and pragmatic communication

(Tager-Flusberg and Anderson, 1991; Baron-Cohen, 1995; Kasari, 2002; Jordan, 1999). Both verbal and non-verbal communication might be affected (Koegel, 2000; APA, 2000).

With a focus on how spontaneous communication is influenced, this section now examines the development of social communication within children with autism. Functional verbal communication might never be developed, as 30% of people with autism are non-verbal, although both higher and lower estimates are given by some authors (Wetherby, Charman and Stone, 2006). Particularly relevant to this study is the fact that autistic children initiate communication far less often than TD children. This is true even for many autistic children with good language and speech skills (Jones, 2002). Some autistic children may not recognise the need for verbal communication (Wall, 2004), while others develop speech at a normal age but fail to use it reliably or at all for communication with others (Landa, 2000).

Social communication difficulties may be seen in autistic children from as young as 12 months old, and by two years of age, autistic children have a distinct communication profile (Wetherby *et al.,* 2007). For example, while TD children often gain at least some joint focus skills within the first two years of their lives, the joint attention skills of autistic children can be delayed (Moore and Dunham, 2014).

Numerous studies have found differences in the social communication skills of autistic children as compared to both non-autistic Developmentally Delayed (DD) children and TD children. Researchers have also reported impact on both verbal and non-verbal communication skills. For example, McGee *et al*. (1997) found that young autistic children focused less on either adults or other children, spoke less, and were less likely to place themselves in proximity to other children. Wetherby *et al*. (2007) also found that young

autistic children displayed significantly lower performance with regards to shifting gaze, following a gaze or point, communication rate, joint attention, and making conventional gestures. Adamson *et al.* (2009) state that there can be some variation in the procedures of transformation from pre-linguistic to linguistic requests, and then fully social communication for children who have developmental disorders like autism.

Several studies focus on how frequently people with autism initiate communication, their reasons for communicating and their preferred methods of communication (Stone *et al*., 1997; Chiang and Lin, 2008, Chiang *et al*., 2008; Agius, 2009). In terms of older autistic children (aged 6 to 11), Murdock *et al*. (2007) found that autistic children displayed 40 to 57 percent fewer verbal initiations and responses, as well as much less nonverbal communication and joint attention. Pelios and Lund (2001) found that autistic children had more difficulty acquiring expressive communication as compared to receptive communication. As Mundy *et al*. (1986) conclude, children who do not have competent speech skills often initiate very little communication.

Earlier studies highlighted a crucial difference in communication initiation by autistic children and TD children. The former often initiate communication only two to three times an hour (Stone and Caro-Martinez, 1990), while the latter may during the same time period display 200 instances of spontaneous communication (Wetherby *et al.*, 1988). One possible explanation for such a low level of spontaneity in autistic children's communication is the unusual manner in which these children try to communicate. Others might not often be even aware that the child is trying to communicate with them. For example, a child's request for something could be in the form of challenging behaviour. Alternatively, adults may anticipate and fulfill requests quickly to avoid challenging behaviour, limiting additional communication (Flack *et al*., 1996).

Bearing in mind this significant difference in the levels of initiated communication seen in autistic and TD children, it could be argued that an AISI to encourage spontaneous communication by autistic children should include targets for adults to achieve regarding noticing and responding to the divergent communicative attempts of autistic children.

2.6.5 Autism as a transactional condition

The developmental trajectories of children with autism are usually delayed rather than deviant, and the condition is to be considered as transactional in nature (Morgan *et al*., 1989). Using a developmental theory perspective, researchers (e.g. Rogers and Ozonoff, 2006; Greenspan and Lourie, 1981) also contend that autism should be considered within the context of TD trajectories. Gerber (2003) further argues that children with autism follow similar developmental sequences in social communication skills and that, as Prizant *et al*. (2000) argue, much of this learning occurs through reciprocal interaction with adult caregivers. However, as Kanner (1943) concluded in his seminal research, children with autism are latecomers on this TD communication platform.

2.6.6 Analysing social communication difficulties in autism

Difficulties with social communication in children with autism can be examined from two different perspectives: capacity for symbol use, and capacity for joint attention (Scahill *et al*., 2013). The emergence of joint attention in the communication development pattern of a child occurs before "word pattern" development. Hence this factor is considered to be more important (Kasari *et al*. 2012). Several longitudinal studies have provided evidence of a relationship between language outcomes and joint attention. The inability to initiate communication, or problems associated with initiation, is seen by these researchers as a response to lack of joint attention, which can lead to many difficulties in language

development and learning (Mundy *et al*., 2010). Baron-Cohen (1989) emphasises that communication and joint attention help promote communication within the context of adults modelling words for specific objects and referring to those objects from a joint perspective.

In general, important differences are evident in the trajectory towards social communication amongst TD and autistic children. McGee *et al.* (1997) conclude in their comparison of TD peers with three to four-year-old autistic children that there are clear differences in communication patterns. Autistic children focus less on other children, and adults were also found to vocalise significantly less. Wetherby *et al.* (2007) argue that when compared to TD children, autistic children perform less well on social communication measures, including gaze shift, gaze/point follow, rate of communication, joint attention and intentional communication.

Therefore, teachers need to understand and modulate their interactive forms and approaches based on the different communication development trajectories of autistic children. Understanding these challenges will help provide insights on how adults should modulate their interactive style when working with children with autism.

The next section focuses on intentional and spontaneous communication, and challenges which may be associated with initiation of such social communication by autistic children.

2.6.7 Intentional spontaneous social communication in autism

This thesis focuses on intentional, spontaneous, social communication. Autistic children appear to find both intentionality and spontaneity problematic. Children with autism may communicate for a number of reasons, using several forms to transmit their information.

There are three major categories of intention that communicative acts may serve, including: behaviour regulation (e.g. requesting and protesting); joint attention (e.g. commenting and providing information); and social interaction (e.g. expressing feelings, seeking attention or approval, social games or routines, greeting and calling others) (Prizant *et al*., 2000). This section addresses how these functions of communicative actions are linked to interventions targeted towards autistic students.

This research is focused on the intentional, spontaneous communication of the child and the impact that adult interaction style has on this communication. Therefore, understanding the importance of intentional communication is key to understanding the challenges faced by the autistic child. Communication may not always be intentional. For instance, the cries of a baby may not necessarily mean they want to gain the attention of an adult. Bruner (1981) argues that intentionality in communication is predominantly linked to the ability to persist and reach a given goal. For children with autism, such intentionality is often difficult. The Theory of Mind approach (ToM) suggests that autistic children find it difficult to initiate communication because of problems in assigning thoughts and emotions to themselves and others (Baron-Cohen, 1995). Hobson (2002), on the other hand, focuses on intersubjectivity difficulties. This can be linked both to awareness of the autistic child in the minds of their peers and adult caregivers, and to difficulties associated with the discrimination of me-ness and you-ness (Hobson, 1993). Understanding factors that contribute to the autistic child's challenges can help inform appropriate adult interaction styles.

When comparing a group of autistic two-year-olds with a group who did not have autism, but were matched for age and developmental level, Hobson (2007) observed that group differences emerged at both dyadic and 'person-person-world' (joint attention, or triadic)

relations. At the dyadic level, parents indicated that, in addition to an absence of frequent and intense eye contact, none of the children with autism used noises communicatively, or participated in turn-taking with adults. However, 50% of the control children were reported to show each of these kinds of behaviour. Similarly, 50% of the infants in the control group offered objects to others; none of the infants with autism did so (Hobson, 2007). Therefore, it is evident that joint attention levels of autistic children are generally lower than those of TD children. As Mundy *et al*. (2010) argue, the inability to initiate communication can be a response to a lack of joint attention. The authors contend that understanding difficulties that can impair joint attention will help researchers better understand child-initiated communication. Chiang *et al*. (2008) contend that low joint attention amongst autistic children is predominant, and that understanding how autistic children initiate communication and social interaction can help improve the communication skills of the autistic child.

Stone *et al*. (1997) argue that communication intention and spontaneity should be linked to the ability of the autistic child to develop joint attention. These authors conclude that children with autism are seen to show less intent to keep eye contact and follow the line of view of the adult carer with their eyes. Lord *et al*. (1994) also find that children with autism show less use of eye gaze to communicate with others, and their eye gaze is less integrated with other communicative forms. Osterling and Dawson (1994) state that mother-infant eye contact is relatively limited in children with autism, and Charman. *et al.* (2003) record behavioural differences related to eye gaze, perception and joint attention. Dawson *et al*. (1998) document difficulties in understanding the mentalistic relevance of gaze, suggesting that children with autism show abnormal correlates of face recognition.

Shumway and Wetherby (2009) conclude that children with autism may compensate for difficulties in use of gestures and eye gaze with unconventional or primitive forms of communication, including the manipulation of hands or body. Goodhart and Baron-Cohen (1993) argue that when compared to TD children, autistic children use less pointing for joint attention purposes. Colgan *et al*. (2006) argue that intentionality in communication should also address non-verbal communication patterns, including gestures, as children with autism often exhibit decreased communicative variety. Therefore, it can be argued that the quantity and diversity of communicative forms can be unclear, given the complexities inherent in communication. These complexities in terms of communicative gestures can directly impact the interactive style of the adult. If the adult does not understand a gesture, movement or behaviour as communication, they will not respond.

Twachtman-Cullen and Twachtman-Reilly (2007) argue that there can be multiple degrees of lack of intentionality in communication, varying from the inability to provide any kind of intentional communication, to problems in certain pragmatic functional abilities, including inability to perceive and use symbols. These authors argue that intentionality in communication changes throughout the developmental trajectory, so it is important that the type and degree of intentional communication is identified and understood by the adult carer.

Influential research by Stone and Caro-Martinez (1990), consisting of observation of 30 children with autism in a school setting, suggest that communication patterns may be divided into certain behaviours, described as: seeking attention from someone, engaging in social interactions, and making requests. Also, in a study of 18 children with autism and speech disorders, Potter and Whittaker (2001) demonstrated that spontaneous

communication most commonly related to making requests, rejecting and protesting. Furthermore, through comparing forms of communication between 14 children who are autistic and 14 children with other communicative and developmental issues, Stone *et al.* (1997) found that autistic children requested more often but communicated less frequently. Chiang and Lin (2008) also found that requesting or rejecting displayed the highest rate of spontaneous communication, and this was supported by a later study of 11 autistic children by Agius (2009).

With regards to the methods of spontaneous communicative behaviour, Stone and Caro-Martinez (1990) and Potter and Whittaker (2001) found that non-verbal methods, including various forms of physical contact, were most often used. In addition, Chiang *et al.* (2008) identified that autistic children had behavioural difficulty in coping with multi-tasking, especially those tasks which involved explanation, pointing, and the moving and giving of objects. On the other hand, Agius (2009) found that verbal communication, motor action and eye contact were most commonly used by children.

Communicative difficulties also include difficulties with pointing, such as when referring to an object or requesting (Camaioni *et al*., 2003) This may occur independently from verbal communication (Baron-Cohen *et al*., 1992).

Most studies have failed to find significant differences in the rates of spontaneous communication by autistic children. A few studies have observed such variations, finding that spontaneous communication was initiated by autistic children more frequently within tasks that were unstructured (Stone *et al.*, 1997). However, Chiang (2008) concluded that structured academic environments tended to encourage spontaneous interaction. While O'Reilly *et al.* (2005) suggested that autistic children had a high rate of being excused from academic tasks by deliberately injuring themselves, these authors noted that self-injury did

not occur during free time or in less structured environments, and that most of the spontaneous interaction displayed by autistic children occurred with only one communication partner, and within groups of fewer than four individuals if there was an adult present.

Children with autism may initiate communication through echolalia, where words and phrases are repeated immediately after being spoken; delayed echolalia, where words and phrases that were previously heard in the past are repeated (Bogdashina, 2005); and mitigated echolalia where the repeated phrases have been modified slightly (Roberts, 1989). Autistic children may initiate communication through any form of echolalia, particularly with regards to requesting, providing information, giving directions and protesting (Prizant and Rydell, 1984). Echopraxia may be regarded as like echolalia except with regards to gestural language, and some autistic children would rather communicate in this manner (Jordan, 1993). However, formal sign language may be difficult because of problems making gestures, and could be too abstract, especially for younger children (Williams *et al*., 2004).

Children with autism may also use pronouns (I, you, we, etc.) incorrectly, and this can still be evident among autistic adults (Bogdashina, 2005). Errors with pronouns may occur because pronouns alter depending upon the situation rather than being permanent (Bogdashina, 2005). Similarly, there may be problems with deictic words (tomorrow, yesterday, that, this) and the different verb tenses (Noens and Van Berckelaer-Onnes, 2004). Also, since autistic people frequently use language literally, difficulties may arise regarding politeness and humour (Bogdashina, 2005). Furthermore, autistic children often

give names to people and to objects which only they (and possibly their parents) understand (Frith, 2003). Poor intonation may also be present.

Repetitive questioning, whether verbal or non-verbal, may also be used by autistic children to initiate communication. They may know the answer, but seek predictable responses as a form of reassurance. Usually the questioning refers to something that they feel very passionate about (Bogdashina, 2005). Autistic children may also have 'conversations' without the presence of a partner to converse with, and it has been suggested that adults should display an interest in this and then gradually change it into a process of taking turns.

As Chiang (2008) argues, the restricted use of verbal and nonverbal communication forms, joint attention and limited communicative intentionality in children with autism can result in challenging behaviour, which can act as a major stressor for adult carers. Van Berckelaer-Onnes *et al*. (2002) further argue that improvements in the communicative skills of autistic children can help in the reduction of challenging behaviour.

It can therefore be concluded that understanding the particular ways in which autistic children can initiate social communication is important, as there is a need to understand why and how there are differences across autistic children's behaviour and expression. In light of this view, understanding and arriving at ways to improve communication by and with autistic children is key to arriving at clarity on possible teacher-led interventions. The AISI was developed with these in mind, and encourages staff to set up situations where communication is most likely to occur (for example, one-to-one communication). Staff should watch for and respond to all communicative attempts, including unconventional communicative attempts.

2.7 Interventions to foster spontaneous communication

To date, an assortment of approaches have been developed to assist in facilitating social communication abilities in children with autism. Classification is not simple, as there are numerous taxonomies, which can be based on subjective judgments and are not always in agreement (Jordan *et al*., 1998; Simpson, 2005; Yoder and McDuffie, 2006; Ospina *et al*., 2008; Kalyva, 2011). In this thesis these approaches are mainly classified into two broad categories, following Ingersoll and Dvortcsak (2006) and Kossyvaki *et al*. (2014), as naturalist/behavioural approaches and developmental/relationship-based approaches. There are, of course, also some approaches that incorporate elements of both naturalist/behavioural and developmental/relationship-based approaches (Ingersoll and Dvortcsak, 2006). These are the Training and Education of Autistic and related Communication handicapped Children (TEACCH) approach (Lord and Schopler, 1994), and unaided Augmentative and Assistive Communication (AAC). Simpson (2005) argues that these interventions can be both types of approaches at the same time, based on the role of adult style. This thesis classifies them as skill-based interventions, following his example (*ibid*.). He defines skill-based interventions as those that target the particular needs of children with autism to improve functioning in specific areas. In this category, however, Simpson includes interventions such as Picture Exchange Communication System (PECS) and EIBI, which were classified as behavioural/naturalistic in this study. This inconsistency further illustrates the issues arising from the absence of a widely-accepted taxonomy.

AISI is largely based on developmental/relationship-based approaches. This is in agreement with research stating that facilitative strategies are more suitable for teaching initiation than prompting strategies, which are more successful for teaching discrete skills (Rydell and Mirenda, 1994; Salmon *et al*., 1998) and research showing that behaviour of

adult communication partners affects the child's communication greatly (Nind, 1999; Potter and Whittaker, 2001; Prizant *et al*., 2006).

Kossyvaki *et al.* (2012) state that naturalist/behavioural interventions focus mainly on the child, while developmental/relationship-based interventions focus on both the adult and the child. These interventions have some basic similarities, but differ in their theoretical basis. This section of the review examines the basic components of naturalist/behavioural and developmental/relationship-based approaches and critically assesses their differences.

According to Kossyvaki *et al*. (2014), in naturalist/behavioural interventions children are taught new skills in an environment where there is clear evidence of antecedent stimuli and systematic reinforcement of the intervention until there is a corrective response. Furthermore, Avramides *et al*. (2013) argue that this approach targets incremental changes in the child's communication and behaviour using structured environmental conditions. Behavioural cues (or prompts) are said to reinforce the positive behaviour of the child (Ingersoll, 2010). Ingersoll states that behavioural interventions are based on three assumptions. Firstly, interaction between the child and adult takes place in the natural environment of the child. Secondly, the child initiates the teaching intervention. Thirdly, the adult prompts the child to produce the required targeted behaviour, and the produced behaviour is reinforced. The caregiver then shapes the response of the child in order to arrive at complex responses, thereby reinforcing attempts to respond to communication (*ibid*.). However, much research regarding the efficacy of behaviouristic interventions has been carried out in laboratory conditions, or in one-to-one 'table work' rather than typical school settings. Much is also clearly adult-initiated, as it is usually adults who create the plans for ABA/EIBI procedures and formulate goals for these.

Some researchers (Kossyvaki, *op cit*., is a notable example) argue that behavioural interventions directly contribute to improvement in child communication and social capabilities through reinforcement, prompting and modelling. Interestingly, critics of this approach also target these assumptions. Ingersoll (2010) contends that when skills are learned in a highly-controlled environment, the child learns to adapt to the environment and to address simple directions (e.g. drawing shapes), but this has limited impact on social communication (e.g. interacting in social games). Furthermore, McAteer and Wilkinson (2009) contend that such methods often use irrelevant reinforcement, making it difficult for the autistic child to connect communication with achieving specific social ends.

The three broad approaches to teaching social communication in autism are detailed in the following sections. Interventions are briefly described, and this information is followed by the theoretical positions regarding facilitating communication and/or the advice provided by these interventions with regard to adult style in communication interactions with autistic children. Taken together, this data (and the extensive practitioner experience with interventions that it represents) formed the foundation for the development of the AISI principles and communication opportunities that will be described later in this chapter.

2.8 Naturalist/behavioural interventions

A number of interventions that directly relate to the naturalist/behavioural approach have been developed over the years for autism. These focus on understanding and shaping the behaviour of children with autism.

Early Intensive Behavioural Intervention (EIBI) is a highly-structured teaching approach that originated in the Lovaas/Young Autism Project model, which is based on the principles

of Applied Behaviour Analysis (ABA) (Lovaas, 1987). Important aspects of EIBI include: using a 1:1 adult-to-child ratio in the early stages of intervention; discrete trial training, which is a specific teaching procedure; and implementation of the programme for 20 to 40 hours per week to children between the ages of one and four (Smith, 2010). Generally, EIBI is implemented with children within a home environment or a school environment, under the supervision of personnel trained in ABA procedures (Maurice, 1996). Variables that can influence the outcome of EIBI include duration and intensity, setting, the person administering the intervention, and staff supervision.

Pivotal Response Training (PRT) is an approach using mainly ABA principles but also developmental procedures targeting five 'pivotal' areas that are said to have a collateral effect on other areas of functioning (Koegel *et al*., 2006). In PRT, various methods are used to increase the responsiveness of students to environmental and social stimuli, such as interspersing easy and difficult tasks, providing choices, teaching within the natural context, and making use of preferred activities and items for motivating children (Iovannone *et al*., 2003).

The Picture Exchange Communication System (PECS) is a picture-based AAC system, specifically designed for non-verbal children with autism (Flippin *et al*., 2010; Ganz *et al.*, 2011). This system was first developed by Bondy and Frost (1994) and is based on fundamental behavioural principles, such as reinforcement techniques. According to Bondy and Frost (1994), PECS aims to teach children how to use functional communication in a social interaction context. PECS has been found to positively impact spontaneous communication (Howlin *et al*., 2007). Gordon *et al*. (2011) concluded that adult involvement in PECS usage largely determines the range of communicative behaviour. A

focus on adult interactive style in PECS is also supported by Flippin *et al*. (*op cit*.) and Yoder and Stone (2006).

Some practices adopted as part of EIBI, PRT and PECS have important implications for spontaneous communication. For example, Cohen (2006) argues that EIBI requires specificity and clarity while providing the stimulus. This clearly relates to the ability of the adult to adopt a positive interactive style. Magiati (2007) concludes that improvements impacting IQ, language and play could be linked to adult involvement and provision of the stimulus. As Richman (2001) argues, adults are advised to get the child's attention before presenting the stimulus. PRT also includes teaching tactics can be utilised to encourage spontaneous communication. In PECS adults have to set up environments which promote the child's initiations and then wait for them to take action. Adults are also encouraged to show with their body language that they are available for communication, and if this does not work, to use physical or visual prompts.

Although facilitative adult interactive styles were referred to in many behavioural/naturalistic interventions, few studies examined the impact of adult style on children's social communication. To some extent this can be explained by the fact that other variables such as IQ, adaptive behaviour and language are most commonly examined when behavioural/naturalistic interventions are used (Eikeseth et al., 2007; Remington et al., 2007).

2.9 Developmental/relationship-based interventions

The focus of developmental/relationship-based strategies is the affect-laden relationship between the child and the adult, which is said to be the primary requirement for learning (Ingersoll *et al*., 2005). Another key assumption is that the child is the leader, and the adult should take cues from the child to help develop his/her competencies. The social demands, as well as the language level, are set by the child. Ingersoll *et al*. (*op cit*.) also report that the environment should not be controlled, but should be set up in a manner that helps the child to initiate communication.

Goldstein (2002) states that the purpose of relationship-based approaches is to ensure that the child develops joint attention and initiates communication, thereby addressing the key challenges linked to autistic children's communication. Ingersoll (2010) also stresses the need for affective and emotional interaction.

Social Communication Emotional Regulation Transactional Support (SCERTS) was developed as a service provision guide for practitioners, teachers and parents to address the needs of autistic children by using highly individualised programmes (McConachie et al., 2007). This framework promotes an effective partnership between teacher and parent, helping them develop their interaction skills and aiding the development of verbal communication skills (Rubin et al., 2013; Walworth et al., 2009). In addition, Kent (2013) indicates that the SCERTS model can be used as a transactional support model, which helps to support the education, communication and behaviour of autistic children.

O'Neill *et al*. (2010) elaborate the stages of interpersonal and learning support in SCERTS. In the social partner approach, the autistic child uses very few words and phrases and finds

it difficult to initiate intentional communication. In the language partner stage, the child has some knowledge of phrases and the adult partner can promote intentional communication. In the final stage, the child is able to use 100 or more phrases and has effective intent and communication skills. Adult interaction with the child varies based on the stage of development. Adults should be responsive and foster initiation, irrespective of the stage of development (Prizant *et al*., 2006).

Rubin *et al*. (2013) state that adult interaction defines the child's responsiveness, including: the ability to keep the child's focus of attention; understanding the emotion and pace of the child's response; and responding to the child in an appropriate manner, based on recognising the signals and signs of dysregulation. Molteni *et al*. (2013) also argue that the interaction efforts of the adult, through imitation of child-initiated action and pausing when there is an anticipated response from the child, indicates the centrality of adult attention.

Other interventions focus on non-verbal forms of communication. These include Music Therapy, Musical Interaction and Intensive Interaction. According to Reschke-Hernandez (2011), the availability of non-linguistic communication means, coupled with adult attention to, and facilitation of, this communication, may explain the efficacy of music therapy for improving communication overall. Silverman (2008) places communication through music alongside other non-verbal communication, such as the use of space, smell, posturing, movements, vocal features, attire, distance, pupil dilation, eye contact, facial expressions and gestures. Based on the research related to music therapy, such factors may be especially useful for facilitating communication.

Intensive Interaction (Nind and Hewett, 1994, 2001; Caldwell, 2008) facilitates

spontaneous interaction by following the principles of caregiver/infant communication, modified to apply to older children (Nind and Powell, 2000). Intensive Interaction principles include sharing physical space, practicing eye contact, facial expressions, allowing the child enough time to respond, imitation, acknowledging all communication attempts, taking turns, imitation, and reading facial cues, body language/other non-verbal signals (Nind, 1999). The adult teacher/carer should be patient and attentive, presenting the child with space to practice these methods and responding positively to improved behaviour (Nind and Hewett, 2001).

Another group of interventions in this category focus on supporting parents or staff to work more effectively with their child. These incude Relationship Development Intervention (RDI), the Son-Rise or Option approach, and the Developmental, Individual Difference, Relationship-based (DIR) intervention.

In RDI, the parents of the child are the primary agents of change, and the programme enables parents to perceive and scaffold opportunities for their child, and to give thoughtful and flexible responses (Gutstein, 2001; Gutstein and Sheely, 2002). The reliance on, and training of, adults as the main method of addressing the needs of autistic children means that RDI offers support for techniques that can be used in AISI.

Son-Rise (Kaufman, 1994; 2002) also suggests a child-centred approach in which adults try to imitate the child to establish a mutual connection, attempting to generate energy, excitement and enthusiasm to develop a relationship with the child. Observation, positioning, and animated responses are highlighted, as they are in AISI.

The Developmental, Individual Difference, Relationship-based (DIR) intervention is the

basis of Floortime Play Therapy intervention (Greenspan and Wieder, 1998, 1999; Wieder and Greenspan, 2003). Children are supported through RDI to go through the process of building an identity and a communicative style as they learn how to read and reciprocate emotions and language (Greenspan and Wieder, ibid.). Children are engaged in conversation using changes in pitch, positive words, touch, movements, and other verbal and non-verbal gestures, with the child's sensitivity to sensory stimuli taken into consideration (Greenspan and Wieder, 1998; Schertz and Odom, 2004).

Floortime's proponents have encouraged others to build upon its methods and techniques; for example, Sonders (2003) put forward a developmental model called 'Giggle Time.' Using this model, communication is turned into a game, assigning importance to the child's verbal gestures through turn-based speech initiated using non-verbal communication such as gestures or establishing physical closeness to the child. Responses are kept interesting using a variation of facial cues, body language, pitch and volume. If this is difficult for the adult, puppets can be used to imitate animation (Greenspan and Wieder, 1998). Turn-based interaction is encouraged through problem-solving exercises. For example, the adult should do something wrong deliberately, like putting the child's shoes on the wrong feet, so that the child can notice, express that it is wrong, and attempt to fix it (Greenspan and Wieder, 1998.)

Sonders (2003) suggests that the lower the ability of the child to retain attention in conversations, the more gesticulation and motion is needed to engage the child. Floortime advocates suggest that adults following the child's lead in terms of topic, attention, rhythm and speed, responding consistently to even non-verbal or unusual responses. The approach relies upon physical closeness, occasionally deviating from routine, and the adult staying

animated throughout. These tactics are very similar to those used in the Son-Rise approach, and also in Intensive Interaction.

The Hanen approach, particularly the 'More than Words' programme focuses on parents developing a system of communication with their child (Pennington and Thomson, 2007). The Hanen system aims to aid communication via vocabulary learning, using the Observe, Wait and Listen (OWL) technique (Manolson, 1992). The child is encouraged to lead the conversation according to their own interests, with parents observing and imitating, while occasionally supplementing with non-verbal and verbal gestures (*ibid*.).

The teaching aspect of the Hanen approach is aimed at the parent rather than the child, encouraging them to use simplified language, create scenarios that encourage the child to contribute, and be alert to the autistic child's attempt to communicate, including subtler non-verbal clues (Pennington and Thomson, 2007). Vital aspects of this approach are mimicking gestures, actively looking for attempts to communicate, accessible phrasing, and allowing the child to set the pace (Manolson, *op cit*.). Problem-solving opportunities, fun noises, touch, rhythmic speech, smiling, tickling and other strategies are used to make communication appealing for the child (*ibid*.; Sussman, 1999). Many of these strategies have been adopted as part of AISI.

Responsive Teaching (RT) shares a similar focus on emotional communication and response to these parent-focused interventions, but is designed for use by therapists and teachers. Staff are told to use the speech and actions of a child to communicate on a similar level (Mahoney and Perales, 2003; Mahoney and McDonald, 2007). Imitation is key, and verbal communication is used in conjunction with pointing, gesturing and the use of

objects. Eye contact is encouraged as the child's interests are followed by the adult, mutual reciprocation of communication encourages spontaneous communication and, finally, using a number of verbal and non-verbal gestures simultaneously creates a stronger focus and more effective interaction.

2.10 Skill-based Interventions

Two visually mediated educational approaches belong to this category, which was added to Ingersoll's and Dvortcsak (2006) classification system, as they have elements of both behavioural/naturalistic and developmental/relationship-based approaches. These are TEACCH and unaided AAC.

TEACCH is a framework for educating children with autism that includes organising tasks and workspaces in specific ways. Ozonoff and Catchcart (1998) report that children who received four months of a home-based TEACCH programme presented better social and interaction skills, when compared to children who did not have the same intervention. D'Elia *et al*. (2013) observed a positive correlation between a school-based TEACCH programme and reduction of both autistic symptoms and maladaptive behaviour.

Mesibov (2007) argues that adults using TEACCH programmes need to be more intuitive to the needs of the child and should give information to the children based on their capabilities. Therefore, understanding the child's ability is important, as is the interaction and provision of visual cues. Lord and Schopler (1994) argue that social reinforcement strategies play a key role in this approach. These authors argue that the adult interaction

should be governed by multiple communicative opportunities across settings. These criteria have clear utility within an AISI approach.

Unaided AAC has been defined by Mirenda as *"the use of manual signs such as gestures and pantomime"* to encourage interaction (2004) (aided AAC uses items or devices). A notable example of unaided AAC is Makaton, a system which can facilitate communication for children with autism or other learning/developmental disorders by highlighting common words or phrases. It works best when used in combination with other AAC methods or language applications (Walker, 1976; Wall, 2004). Simple words, such as basic nouns, are suggested to begin with, as they are less abstract and can be signalled in conjunction with gestures; non-verbal gestures such as 'yes' or 'no' by shaking the head, or greeting others by way of waving are also incorporated under AAC (Salvin *et al*., 1977; Watters *et al*., 1981).

Unaided AAC emphasises the need for adults to be good communication partners who try various means of communication (verbal and non-verbal), combine methods, and simplify their communication to meet the needs of children with communication difficulties.

2.11 Key differences and similarities between naturalistic/behavioural and developmental/relationship-based approaches

While developmental/relationship-based approaches promote a child-centric environment and allow a child-shaped intervention, the naturalistic/behavioural approaches promote a controlled environment and an adult-promoted intervention. Kaiser *et al*. (1992) argue that naturalistic approaches can focus on social communication skills without setting specific communication outcomes. On the other hand, developmental approaches target specific

communication functions and skills. While naturalistic approaches look for intentional communication, developmental approaches respond to the child's intention to communicate. This attempt can be pre-intentional or unconventional.

It is evident that multiple efforts and modalities may be used to show intent to communicate, and developmental approaches support this focus. Adult interactive style has great significance in a developmental approach, because the adult is required to understand the child's needs and develop a strong relationship by promoting mutual enjoyment and interaction.

There are also similarities between the naturalistic and developmental approaches, including focus on child-initiated attention (Kossyvaki *et al*., 2014). Both approaches support the need for children to be comfortable with the environment, and promote child-initiated responses. Additionally, Brunner and Seung (2009) conclude that both methods aim to create environments that provide communication opportunities.

The evidence for which type of approach is more effective is inconclusive, and identifies the need for more research. For instance, Sherer and Schreibman (2005) and Stoelb *et al*. (2004) argue that behavioural interventions are effective when the autistic child is more cognitively able or at a higher level of communication development, while a developmental approach is more effective for children who are less cognitively able or who have limited verbal communication. Other researchers (for example, Yoder *et al*., 1995), present the reverse argument, stating that children with lower levels of language ability benefit from a more structured environmental approach, while those with higher language skills perform better when a relationship-based methodology is adopted.

Additionally, as Mahoney and Parales (2008) argue, in adult (teacher/carer)-directed interventions, effectiveness can be linked to the adult's communication style and approach. Therefore, differences in evidence may be explained by differences in adult interactive style. This has implications for implementation of an AISI.

2.12 Conclusion: Implications of literature review for development of an AISI

As outlined in the previous sections, current research argues that facilitative adult interaction is an important factor in successfully encouraging communication for children with autism. Most interventions suggest ways in which adult interaction style can be adapted to facilitate communication and interaction, as illustrated in *Table 1* and *Table 2*, below. These tables record what was implicitly or explicitly suggested by these interventions, as regards adult communicative style by Kossyvaki (2013) and through the research presented in this chapter.

Interventions to encourage communication should be adapted to meet the needs of individual children with autism - AISI does not offer or advocate a one-size-fits-all approach, nor does it offer solutions to all challenges that children with autism may face. From the research base outlined in this chapter, I concluded that encouraging spontaneous communication was an important goal, that AISI offered a set of principles and concepts that were more likely to achieve this goal than alternative approaches, that AISI could be easily adapted according to individual children's needs, and that it could be used alongside other interventions. In addition, I concluded that helping staff move from adult-led prompting to a facilitating role made sense in relation to the literature reviewed on children's communication development, although I was aware that this could prove

challenging for staff trained in behavioural approaches and from a culture where teacher-led pedagogy is typical.

Furthermore, I concluded that facilitating spontaneous communication could best occur in a real-world environment, which is rich in interesting communication opportunities such as learning, play and everyday activities. Research in real-world environments rather than laboratory settings requires appropriate research methods, as will be discussed in the following chapter.

The principles of an effective adult style emerging from this literature review which seem to be important in developing children's spontaneous communication are classified into two categories—general principles and communicative opportunities—as shown in *Table 1* and *Table 2*.

Definitions of the AISI principles and additional information about their research bases can be found in *Appendix 12*.

Table 1: Support for AISI General Principles by interventions

Interventions	AIBI General Principles												
	Gain attention	Establish proximity	Show availability	Wait for initiation	Respond to all communicative attempts	Assign meaning	Imitate	Follow child's lead	Exagger-ate pitch etc.	Minimal speech	Give time to process	Expand on commun-icative attempts	Non-verbal cues
Behavioural/naturalistic Interventions													
EIBI	√	√							√	√			√
Pivotal Response Training	√							√		√			√
Reciprocal Imitation Training	√	√	√			√	√	√		√		√	√
PECS	√	√	√	√	√						√		
Developmental/relationship-based Interventions													
Intensive Interaction		√	√	√	√		√	√	√		√		√
SCERTS	√	√	√	√	√	√		√		√	√	√	√
DIR-Floortime	√	√		√	√	√	√	√	√			√	
Musical Interaction/ Music Therapy				√	√	√	√	√			√		√
Son-Rise/Options	√	√			√	√	√	√	√			√	
Hanen	√	√		√	√	√	√	√	√	√		√	
Relationship Development			√	√			√	√	√	√	√		
Responsive Teaching						√	√	√					√
Skill-based Interventions													
TEACCH	√									√			√
Unaided AAC													√

Table 2: Support for AISI Communication Opportunities by interventions

Interventions	Communicative Opportunities							
	Choices	Stop part way	Small portions	Inaccessible items	Material they will need help with	Contradict	Non preferred items	'Forget' something vital	Withdraw Attention
Behavioural/naturalistic Interventions									
EIBI	√		√						
Pivotal Response Training			√	√					
Reciprocal Imitation Training									
PECS	√	√	√	√	√	√	√		
Developmental/relationship-based Interventions									
Intensive Interaction	√	√							
SCERTS	√			√	√				
DIR-Floortime		√				√			
Musical interaction/Music Therapy		√							
Son-Rise/Option	√								
Hanen	√	√							
Relationship Development Intervention		√							
Responsive Teaching									
Skill-based Interventions									
TEACCH	√								
Unaided AAC									

2.13 Summary of literature review

This literature review has sought to provide evidence from research that backs using an AISI to facilitate spontaneous communication by autistic children in Saudi Arabia. In order to achieve this objective, a selection of relevant literature was examined and discussed in detail.

This chapter began with an overview of pedagogy, autism prevalence and autism research in Saudi Arabia in order to give context to this study. This overview of existing research highlighted the prevalence of a medical-model approach to pedagogy, the dominance of behavioural approaches over developmental approaches in the education of autistic children, and the lack of Saudi studies focusing on adults and the way they interact with autistic children to foster children's spontaneous communication. It demonstrated a need to introduce and evaluate new developmental approaches in Saudi Arabia, especially since the empirical evidence suggests that these approaches can be effective. Evidence-based practices and pedagogy were also examined, because the literature on autism in Saudi Arabia made frequent references to the need to implement evidence-based practice.

Next, this chapter set out the theoretical framework used to guide the design of an AISI to facilitate spontaneous communication by autistic children in Saudi Arabia. This theoretical framework draws upon the transactional model of child development, which proposes that the development of the child can be influenced by the behaviour of adults, who should accept the same, or more, responsibility for the success or breakdown of the adult-child communication; and also by the social model of disability, which focuses on creating enabling environments (Rieser and Mason, 1990; Llaneza *et al.,* 2010). Hence this thesis' theoretical framework supports concentrating primarily upon guiding adults' behaviour in

order to create an environment that enables and encourages spontaneous communication from children. This theoretical base was analysed in light of AISI, and areas of convergence and divergence were discussed.

This chapter also detailed those aspects of cognitive, hyper-sensitivity, inter-subjectivity, and enabling theories relevant to this thesis, and how these might influence the design of an AISI. It was acknowledged that the theoretical base is contradictory, and open to critique. This uncertainty is reflected in the wide variety of autism interventions, each of which privileges certain theories.

Next, the definition of autism used in this research was presented. Then, social communication was defined and investigated in relation to both autistic and TD children. It was shown that social communication skills and their initiation are important contributors to a child's development, because they allow children to relate to others as well as to attain a degree of control over their environment. However, it was also shown that autistic children initiate spontaneous communication infrequently as compared to TD children. Spontaneous communication was defined.

Literature regarding intentional spontaneous social communication was reviewed. Communicative functions, methods and issues were discussed so as to outline the functions of communication as well as the methods (types) of communication. The current knowledge base regarding autistic children's communicative functions and methods, and related issues, was delineated, as these factors are important considerations when designing an intervention strategy.

Having noted this, a range of literature was subsequently reviewed regarding other autism interventions due to their relevance to the creation of an effective AISI. This research argues that though there is clear evidence of some interventions being more effective when compared to others in some situations, it is important to address the full range of competencies and capabilities that special-needs teachers should adopt in their interactions with children, in order to facilitate their spontaneous communication. A range of intervention categories with implications for the design of an AISI were discussed, with a particular focus on research evidence regarding other interventions that touches on the impact of adult communicative style.

Tables were provided that map the specific AISI principles developed by Kossyvaki (*op cit*.) and used in this research to existing interventions. The majority of these links were derived from developmental/relationship-based interventions. Some emphasis on adult interactive style is common in most interventions in the autism field; however little is known about how it impacts upon children's spontaneous communication. Developmental/relationship-based approaches undoubtedly focus more on adults and the way in which they interact with children. However, due to the limitations of research designs, studies often fail to establish distinct links between adult interactive style and children's spontaneous communication. Researchers generally train adults (parents or teachers) in a set of principles and then measure the children's behavior pre- and post-intervention without necessarily isolating key variables in the adults' behaviour.

Taken as a whole, the information presented in the literature review supports the importance of attention to spontaneous communication development in autism, supports the need to trial and evaluate developmental/relationship-based interventions in a Saudi Arabian context, and suggests that it is important to ensure that the research design collects information about the impact of specific changes in adult behaviour and communication style on the communication attempts of children with autism.

CHAPTER 3: METHODOLOGY

As evidenced by the literature review, a common difficulty faced by children with autism relates to initiating communicative interactions. This is especially noticeable in education settings, where the ability to communicate is key. As was also substantiated in the literature review, the role of adult interactive style is exceptionally important for encouraging spontaneous communication, and is a ripe area for practical research. In this regard, it is apparent that the search for teaching styles that stimulate communicative interaction constitutes an important field of practical research.

The call for more evidence-based research in previous studies has suggested the need to collect data about evidence-based practice, to bridge the gap between academic knowledge and school practice (Mclntyre, 2005; cited in Kossyvaki, 2014). This is particularly useful with respect to identifying ways of implementing and transferring the elements of different types of interventions available in specific school settings (Kossyvaki, 2014). The objective of this study, then, was to propose and test an effective manner for adults to adopt when communicating with children with autism, in order to facilitate spontaneous communication, in the context of a school environment in Saudi Arabia.

In order to have the most positive impact on adult interactive style, it was important to involve the staff as much as possible in designing and carrying out the research. In the past, researchers in this area, particularly in Saudi Arabia, have often ignored the opinions and experience of the staff who work with children with autism. As other researchers have noted, facilitating action research is a powerful way to "to lessen the commonplace occurrence of research that is done *on* or *to* practitioners rather than *with* practitioners"

(Berger and Baker, 2008, cited in Locke, 2010). Therefore, it was decided that the planning and design process for the research undertaken for this thesis should involve staff, as their ability to reflect on and enhance their experience of working with autistic children, and their experiences of implementation of AISI principles during the study, would provide invaluable practical insight. This study also set out to involve teaching staff in the implementation of the intervention, creating trust between the researcher and staff participants, and supporting them to improve their style of interaction.

This chapter presents the research aims and questions, provides the key terms of the research, outlines the methodology used, delineates the sample information and setting, and describes the research process. It includes information about how the researcher supported staff to adapt their behaviour and interactive practices, in order to assist children in their communicative expression. It also discusses ethical concerns and considerations and how these were addressed during this study.

3.1 Research aims and questions

The overarching research aim was to evaluate the effectiveness of the implementation of Adult Interactive Style Intervention (AISI) to encourage and facilitate spontaneous communication with children who have an autism spectrum diagnosis in the Saudi Arabian context. From this aim, the primary research question was derived:

When adults change their style of interacting with children with autism, what effect does it have on the way that children initiate communication bids?

Following on from this main research question, four sub-questions were identified:

1. *When adults change their interactive style, what differences can be observed in the frequency with which the children they work with initiate communication with others?*

2. *When adults change their interactive style, do children then also adopt different methods of initiating communication?*

3. *When adults change their interactive style, which activities lead children to initiate more communication?*

4. *To what extent are adults able to change their interactive style?*

3.2 Philosophical underpinnings of the study

In order to fully understand the thinking behind the study, the theoretical principles and key terms regarding sociological approaches to education first need to be explored. In research undertaken in social education, the philosophical rationale of studies is often neglected in pursuit of hard data (Scott and Usher, 1999). It has been indicated by a number of studies that the ethical mindset and value set (or 'paradigm') of the researcher has a significant influence on the way the study is framed and conducted (Cohen *et al*., 2007; Kuhn, 1962). This was later termed 'research culture' by Johnson *et al*. in 2007. Though the number has been debated, this study was conducted under the premise that research paradigms in this field can be divided into three categories, each with their own stance on existential issues and human nature: positivist, interpretivist and pragmatic (or mixed-method) (Johnson, *et al*., 2007).

These three paradigms operate under ontological, epistemological and methodological frameworks, and so these terms must be clarified. *Ontology* refers to the debate between objective realities and constructed realities (Burrell and Morgan, 2005), *epistemology* to the state of knowledge and its subjectivity or rigidity. *Methodology* can be described in two different ways, as delineated by Burrell and Morgan (2005). The first is nomothetic, based on systematic procedure; the second is ideographic, which implies a more nuanced relationship between researcher and participant. In respect to these characteristics, a methodology will be chosen which fits the ideological view of the researcher, and it is acknowledged that this may affect the methodology and sample chosen, the results, the analytical framework, and the conclusions drawn from the data.

These paradigms will be explored via the framework set forward by Mertens in 1998 (and later expanded upon by Cohen *et al*. in 2007). To take positivism first, this paradigm takes the ontological position that supports objectivity, typified by an impartial approach by the researcher and the use of predominantly hard quantitative data. Interpretivism, conversely, acknowledges that realities are more subjective and are, at least in part, societally constructed. This often decides the subject and form of the research; the interpretivist paradigm tends to primarily use qualitative data. Though there are purists who consider these two paradigms to be mutually exclusive, the strict boundaries between these paradigms have often been challenged by modern researchers. 'Pragmatist' researchers call for choosing research methods based on what is best suited for the research problem, regardless of the typical traditional paradigm (Onwuegbizie and Leech, 2005; Cohen *et al*., *op cit*.; Robson, 2002).

This study adopted a pragmatic approach with regards to methodology, employing a tailored method for the study's specific aims, with equal proportions of quantitative and

qualitative data. Its philosophical alignments with regard to ontology and epistemology weessentially interpretivist, in that the reality described was that constructed by the participants, and may have been affected by the act of being observed. In other words, it is acknowledged that had the study been repeated with all participants (or the researcher) replaced, results may have differed.

3.3 Research design

The research design demonstrates how the research has been structured to explore the main research question and its four sub-topics. To paraphrase Yin (2003), research design is the process by which a study's empirical data is connected to the initial research questions and its conclusions, and entails the outline of the research problem, creating the questions the study will aim to answer, and planning data collection, data analysis and presentation of the findings in ways that are tailored to the research problem. This section will explore methods by which a suitable design was chosen for tackling the outlined research questions.

There are several different recognised research designs, as determined by Tesch in 1990. These follow a similar categorisation model to research paradigms. They are split into quantitative/fixed designs, in which the design tends to be solidified before the experiment, and qualitative/flexible designs, in which the design goes through several permutations before the research process is complete (Robson, 2002). There are more commonly used designs within each design category, with qualitative studies tending to be, or use, case studies or ethnographies, while quantitative studies are typically experiments, comparative studies or quasi-experiments (Creswell, 2003; Leech and Onwuegbuzie, 2009).

This study employed elements of both research design types, using a mixed-methods

approach in order to approach all research questions (Teddlie and Tashakkori, 2003). This mixed-methods design was chosen in an attempt to identify changes in children's rate of communicative initiation when the staff adopted their styles of engagement, to explore the role of factors other than AISI, and to also collect data on staff experiences of using AISI, including the extent to which they were able to change their interactive style.

It was necessary to collect both quantitative and qualitative data in order to document changes in staff behaviour and changes to children's spontaneous communication, to see if there were specific tactics or activities that had an impact on communicative interactions, and to explore challenges experienced by staff. The use of quantitative data arose from a need to examine the frequency of communicative initiations before and after the AISI intervention. This was then enriched by the qualitative data, received from and reflected on by the teachers, regarding the effect of the intervention on the individual children and their own experience of using the intervention.

3.4 This study's research design

This study built on Kossyvaki *et al*.'s 2012 action research investigation, which tested the concept of an AISI as used by staff in an educational setting in the UK. As in its precursor, the principal methodological design employed in this study, to carry out research and analyse the results, was based on *action research*. However, there were substantial differences between the design of these two studies, as will be discussed later in this chapter.

A true experimental design would have used children and staff who were randomly assigned to take part in the study, making to easier to see whether the change caused the

effect observed. In a very small school like the Autism Centre, this is impractical. All staff who could take part did so, and some selection of children was necessary as not all children in the school met the research criteria. Once a list had been made of children in these teachers' classes who met the criteria, who would be available throughout the study, and whose parents would agree for them to take part, the group size was already too small to randomly assign children to receive or not receive the intervention. For staff, who had a strong desire and need for help and training, denying that to some members of staff seemed to be unethical, as it could have detrimental impact on both staff and children.

Communication and cooperation between researchers and staff during study design and implementation was crucial for initiating practical methods and solutions, and for interpreting data in a way that was transferable. A quasi-experimental design that compared one group of children who received the intervention and one group who did not was the next possibility considered, but was rejected for both practical and research-goal reasons, as will be explained in the following paragraph.

The researcher did not have access to multiple settings. The number of children who met the sample criteria in the setting available was already limited, to the extent that it was only possible to include one child from each of the Autism Centre's small class groups. Had two groups been used, the intervention and comparison sample would each have been very small indeed, perhaps two or three children per group. A sample of two or three children would be too small to draw any real conclusions from, especially if additional factors affected one child's response (as happened with one child in the sample used). The group of children available to take part in the research was already smaller than some researchers would have found acceptable, with some authors recommending that both

groups in a quasi-experimental comparison study be comprised of between 7 and 40 children (e.g. Suter, 2012). As the intervention was based partly on one-to-one interaction between child and teacher, additional variables in the behaviour of teachers in the comparison group due to personality or background or in the children themselves would have easily confounded the results. Angrist (2003) has described quasi-experimental designs in education as "based on naturally occurring circumstances," which is a good description of why this design fit in the context of a very small specialist school with a limited number of children and teachers available and eligible to take part in the study.

The quasi-experimental design had advantages over, but similarities with, single-case research designs, which are widely used in education research. Because children are individual and complex, it is often important to look at the benefit of an intervention for just one child, not for all children who share an age or diagnosis. As Ary *et al*. write, "single-case designs are basically extensions of the quasi-experimental one-group time-series design" (2013, p. 347). By involving multiple teachers and students in the research design, however, it was possible to look beyond the impact of the intervention on one individual (or both individuals in the teacher-student pair).

In addition, it was a goal of the research to learn about how staff responded to a training intervention and whether they could easily change their behaviour. Involving staff in the research through an action research design seemed the methodology most likely to ensure staff cooperation, and to highlight any individual or cultural barriers to change and develop workable solutions to them during the research process. It also increased the probability that the intervention, if successful, could continue and improve after the research process

was complete, benefiting other children and the staff themselves. Key arguments for selecting an action research methodology are provided in the following section.

3.4.1 Action research

Action research was defined in the 1940s and subsequently popularised in the USA in the 1950s; it was only in the 1970s that it was first adopted in the UK. Since then it has flourished, particularly in confronting the lack of evidence-based practice in special education (Odom *et al*., 2005; Parsons *et al*., 2011). Using this method, there is far more focus on cooperation between those conducting the study and education staff, in order to come to conclusions that are practical, credible, useful and transferable, though not necessarily generalisable. Reason and Bradbury (2001) described action research as *"creating new forms of understanding,"* and condemned action without practical understanding (*ibid*: p. 2).

Applying action research as a methodology in education research involves constant change and growth. However, some researchers (for example, Zeichner, 2001) believe that the quality of much action research is low, due to a lack of clarity in the definition of the concept, allowing for wildly differing approaches. The typology of action research relies on several key factors: the research must be practical, result in change, be cyclical in trajectory, involve feedback for improvement from the participants, and be a process of growth and improvement that aids participant understanding, rather than simple data collection (Elliot, 1991; Zuber-Skerritt, 1996). The reflexivity of the design determines its cyclical motion, as analysis of the results provides a catalyst for innovation and solutions for problem areas, which goes on to provide a base for the study to continue. Participants may identify the idea for change themselves, or it may be presented to the participants,

who then assess its usefulness and help cultivate the idea into something workable. It is then implemented, and the effects are recognised and documented. The researcher works in cooperation with staff to make changes and improvements, and the process is repeated until tangible positive results are observed.

This method requires a high level of reciprocal communication and cooperation, with participants taking responsibility for working together towards the research aims. For this reason, Kemmis and McTaggart refer to it as *"participatory research"* (2000).

Action research can be carried out using one of two methods: either the researcher records the practitioner's ideas and interprets them for the study, or the participants are given complete control of the research. Due to this collaborative element, however, the problem of 'ownership' of the study becomes complicated (Reed, 2005). While the interpretive method gives more control to the researcher, it does somewhat undermine the practitioners' contributions, as the researcher alone will analyse the findings, as pointed out by Whitehead and McNiff (2006.) Whitehead (1989) advocates a more egalitarian approach, fostering a *"partnership"* between staff and researchers to aid collaborative learning; Hall and Hall wrote that this process involved less exploitation and facilitated *"genuine exchange"* (1996: p. 12).

There are a number of advantages of action research in studies such as this one. Most notably, as referenced by Somekh (1995), it provides a dialogue between theoretical research and the world of work and everyday life. The former, the academic side, is a sector most schools feel somewhat separate from, as primary and secondary educators do not tend to have access to academic journals or conferences where academic studies appear. In addition, teachers traditionally pay attention to the bottom line, e.g. 'what

works.' Action research invites teachers to interact through the actual procedures and underlying processes of research in order to find ways to enact change, rather than having to search academic papers, which can be convoluted and hard to understand for non-academics (Zeuli, 1994). Another prominent advantage of action research is the opportunity for staff to receive innovative professional development free of charge and in a convenient location. This allows those conducting the study to give back to its participants, particularly staff who are not usually given comprehensive, up-to-date training (and especially not in the workplace).

Kemmis and McTaggert (1988: pp. 14-15, cited in Locke, 2010: p. 49) identified three types of changes that action research in education is particularly suited for facilitating:

1) *Changes in discourse: ways in which teachers "word" or "story" their identities, knowledges and pedagogical practices;*
2) *Changes in "activities and practices": what teachers actually do in their work and continuing learning;*
3) *Changes in "social relationships and organizations": the ways in which teachers relate with students, parents and the wider community, and with colleagues at a departmental, school and general professional level.*

As will be shown, the design of this research sought to facilitate change in all three of these areas, although the focus was on the second.

Although rewarding, conducting action research can present the researcher with a number of obstacles. Research ethics is one key area in which action research poses a challenge, as observer effects can cause stress to the participants, both staff and children (McNiff and

Whitehead, 2006). There are also issues with creating a time in which the participants, most often occupied at work, can contribute to the research and give feedback.

In terms of methodology, field research does not allow for the levels of control found in laboratory studies, in which conditions can be carefully constructed in order to pinpoint the variables of interest. When conducting action research, unexpected environmental factors can affect the results obtained (Denscombe, 2010). The behaviour of the researcher can also pose a challenge if a close kinship with the participants is forged and objectivity is lost, causing the focus of the study to be compromised (Burns, 2001).

Additional criticisms of action research exist in reference to its rigour and generalisability (Koshy, 2005). These are the two main benefits of conducting laboratory studies, where conditions can be controlled. Action research is not designed to produce generalisable results, only situational results. Accordingly, it can provide solutions only for the specific setting of the study, although these may be used as a guide for research in other environments. These disadvantages, however, can be countered in number of ways, as explained in the following section.

3.4.2 Case studies in action research

According to Robson (2002: p. 178), a case study is:

> *"... a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence."*

The case study approach is generally viewed as offering the researcher a deeper understanding of processes involving people and situations (Cohen *et al*., 2007), and is a

suitable option for research concerned with the questions 'why' and 'how' (Yin, 2003). They allow in-depth investigation of specific situations, which can be used as illustrations of more general points. The action research case study approach also works well within the practical constraints of conducting research in schools. As the case of this research, it permits testing the impact of an intervention in the real-life setting of a school, where the researcher could not randomly assign children or staff to take part, and could not control all possible confounding variables.

Many researchers argue in favour of a case study approach, where the research goals and data collection methods make it feasible (e.g. Denscombe, 1998; Robson, 2002; Yin, 2003; Bryman, 2008). However, according to Burns (2000) this approach is very difficult to follow, due to the extent of the data necessary to comprehend the unit of analysis that the study is focused on. In the present research, however, this issue was of lesser importance, as the framework of the action research required the researcher to spend a significant amount of time in the field in order to gather the baseline data, elaborate the intervention, train the staff, test it, and collect the post-intervention data. This also ensured that the researcher had the degree of oversight required to comprehend important relationships between the data sets, and to work with the staff team to use the data to tell a story about ways of working and relating in a specific special school environment. Quantitative data was derived from a combination of systematic instruments (the highly structured observation schedule), whilst qualitative data concerning the staff members' perception of intervention was collected from semi-structured interviews and evaluation assessment enriched by field notes.

Another argument in favour of the action research-based case study approach comes from previous studies of a similar nature. Many researchers focusing on communication with

autistic children have chosen to conduct the studies in laboratory settings, and the practical applicability of their conclusions has thus been limited (Roos *et al*., 2008). Therefore, certain researchers (Ogletree *et al*., 2002; Chiang, 2009) have claimed that for children with autism, a natural environment, with people they are familiar with is, more suitable for investigating their communicative style and interventions intended to support communication.

However, it is also necessary to mention certain limitations. Case studies are easily biased and can become subjective due to cross-checking being rather problematic (Cohen *et al*., 2007). Their implementation is sometimes inaccurate (Denscombe, 1998; Yin, 2003). Also, rather than producing statistical generalisations, case studies produce analytical ones (Burns, 2000; Yin, 2003; Cohen *et al*., 2007). It is thus the individual reader who decides whether, and to what extent, the research-based case study that he reads is applicable to other settings, situations and participants. This thesis therefore provides a detailed depiction of the study setting and participants to enable other researchers, and practitioners, to evaluate how relevant the results are for their own work. Of course, providing this level of detailed description is also in accordance with the detailed depiction of the situation an action research should include, as suggested by Zeichner (2001).

3.5 The setting

The present study utilised action research (defined according to parameters established by Whitehead, 1989, and Hall and Hall, 1996) in order to explore the impact on children's spontaneous communication when the staff adapted their interactive style to foster spontaneous communication. The aim was to provide a research design that would be applicable in a real-world setting (as opposed to a laboratory setting). Both the researcher

and the research participants (staff) contributed to the design, to ensure that it fit within the school's educational practices and contributed to their improvement. The data collected during this action research process is specific to the setting in which it was carried out, and therefore the research resulted in a case study.

A mixed-methods approach was used in this study in order to answer the research questions, as is proposed by the literature for similar studies (for example, Creswell, 2003; Creswell and Plano Clark, 2007; Ollerton, 2008). Both quantitative and qualitative data was gathered by means of video recordings, semi-structured interviews with participating staff members, and evaluation records supported by field notes. The videos, as well as the evaluation records, provided the quantitative data, which was important for demonstrating whether, and how, the children's spontaneous interaction changed in response to the adults' changed behaviour. The purpose of the qualitative data, which was gathered through conducting semi-structured interviews, was to investigate the principles of the intervention and their impact, to provide a deeper and more complex picture of the implementation process, and to reflect on and enhance the way the AISI principles could best be used in a Saudi Arabian context. By accessing these various sources of both qualitative and quantitative data, it was possible to provide a more accurate and multifaceted case study. It also fulfills the mandate for triangulation, addressing concerns about validity (see end of chapter).

3.6 Sample and setting

In the literature on conducting research (for example, Bryman, 2004; Denscombe, 2010) two ways of sampling are usually referred to: probability sampling, which operates with a universal sample comparable to the population, and non-probability sampling, which uses

certain criteria for selecting the sample, i.e. it is not random. According to Denscombe (2010), studies that are smaller in scale usually utilise non-probability sampling: the person responsible for conducting the study defines a certain feature according to which he chooses participants. For the purpose of this study, a special school for autistic children was chosen, and the characteristics of the staff and children in the school setting dictated the sample to a great extent. The setting, children and staff involved in the research will be described in the following sections.

3.6.1 The setting

First of all, the selection of the setting (a school referred to in this study as the Autism Centre) was based on its reputation as an excellent school. It is a specialist school serving only children with an autism spectrum disorder. The teacher-to-children ratio depends on the activities and children's needs, and ranges from 1:3 to 1:1. It ranks among the best specialised schools in Saudi Arabia, of which there are only a few serving this student group. Furthermore, this institution is well-organised and facilitated a good work environment for carrying out research. The school focuses on improving the services it provides, and seeks to communicate recent discoveries in the field of autism research to both professional staff and the families of autistic children.

The Autism Centre provides an early intervention programme based on comprehensive assessment, with its foundation in behaviour modification. Overall, however, the school utilises an eclectic approach, taking elements from several interventions in order to meet each child's needs. These include TEACCH framework. Teachers working at the Autism Centre have received appropriate training regarding the use of the TEACCH programme, and are therefore able to participate in a process that assists the autistic children in

development, education and learning to meet their basic daily needs. The school also uses aspects of ABA, including PECS. Some staff at the school have also used some elements of the Son-Rise approach (see *Chapter 2* for details of these interventions), interventions that intersect with AISI, although these were not routinely used and staff lacked training and experience with applying them consistently and correctly. Importantly, both school leadership and staff were enthusiastic about taking part in the study.

As noted in *Chapter 2*, previously conducted studies indicated that a developmental approach is more encouraging for children, supports their initiative, and improves the staff's interactive style. Therefore, increased integration of developmental and behavioural approaches was an important aspect of the design.

The researcher decided that a specialist school for children with autism would provide the best setting for carrying out the research, because inclusive education is rare in Saudi Arabia and a mixed-population special school was less likely to have specialist staff available. There were only two autism specialist schools in the city at the time of the research, although another has since opened. The researcher already knew members of the management team at the school, and made a direct approach requesting to conduct the study there. Management were enthusiastic, as the study included staff training at no cost and was seen as having potential benefits for children. The researcher observed staff in the school's five classes and made a direct approach to staff about participating, with management approval. Only those teachers who wanted to participate were included in the study. Staff and management then worked together with the researcher to identify suitable children. Staff assisted the researcher in contacting parents about the research. Only children whose parents agreed to having the take part in the research were included. Criteria for inclusion are discussed in the following section.

3.6.2 Sample inclusion criteria

From the beginning, the proposed sample group for the study comprised six children and six teachers. However, the sample was reduced to five persons from each participant group due to one child's change of residence. One child from each class in the school was chosen, based on the criteria below. Each was then paired with a staff member following researcher observation**.** The Autism Centre is not a large school, so random assignment of staff and students was not practical. In addition, it was important for participating staff to be interested in contributing to the research through active involvement in the action research process.

First of all, the criteria of inclusion were defined. For the inclusion of children, the conditions were:

- Having an autism diagnosis that could be confirmed by the child's file at the institution and by the Childhood Autism Rating Scale (CARS) (Schopler *et al*., 1988) score from a test conducted by an external professional. External professionals were from major specialist hospitals and clinics in Saudi Arabia (for example, King Faisal Specialist Hospital). The Autism Centre also has a team that observes children and meets with parents during the admissions process to ensure that children meet all requirements for a diagnosis of autism, and results of this process are included in the child's school file.
- Infrequent communication initiative, based on observation by teachers and confirmed by the researcher.
- Very limited communication: use of a small number of words regardless of their form (spoken, signed, pictures, symbols, objects etc.), based on observation by

teachers and confirmed by the researcher.

The CARS is a rating scale that covers 15 areas of behaviour that may be impaired in autism. It is used as part of the diagnostic process, and also provides staff with a way to rank severity. It provides a score between 15 and 60, 27-30 is the minimum score for an autism diagnosis. A score over 36 that includes ratings of 3-4 on a sliding scale from 1-4 in at least five of the subscale areas is considered to indicate 'severe' autism. It is widely used and has been well tested for accuracy (Schopler *et al*., 1980).

3.6.3 The sample: Children

Although the staff suggested based on their initial observations that certain children were likely to meet the criteria for inclusion, they chose to administer specific assessment tools. The school has its own assessment tool (unpublished), and this was used by the staff and the Speech and Language Therapist to assess the children. These assessments were later reviewed by the researcher. Furthermore, the staff provided more detailed information about the children in interviews and discussion sessions with the researcher. The participating children's CARS scores ranged from 33 to 51.5 points, which in the CARS rating scale is said to indicate 'severe' autism in four children (Balbaid, Ali, Bashaawry and Tasan) and 'moderate' autism in one, Albeshri (see *Table 3* for details about the children.) Although as noted previously the researcher rejects notions of arbitrary severe/moderate/mild categories of autism, choosing children with CARS scores at this level ensured that there was a strong degree of diagnostic certainty, which would be an important factor for other researchers or practitioners who wish to see whether the results might be applicable to other children with autism.

The verbal capabilities of the children were examined by the specialist psychologist at the Autism Centre. The communication level for each child can be found in the *Table 3*. To summarise, the children were categorised as having communication levels ranging from very limited vocalisation to the occasional use of words. In the PECS system, the children were all on Level 2 or 3, although one infrequently used PECS, as his parents had requested a reduction in PECS use to focus on spoken language, and his staff were complying with this directive. Staff assessments and interviews provided further information regarding the children's level of communication. Pseudonyms have been used for all children

Table 3: Details on the children participated in the study (Pre-intervention stage) (n=5)

Name **(all names changed)**	Balbaid	Tasan	Bashawry	Ali	Albeshry
Teacher **(all names changed)**	Yusef	Haskoor	Alahdal	Olfat	Wedyan
Sex	Male	Male	Male	Male	Male
Age at pre-intervention	7	6	5	5	6
Diagnosis	Autism	Autism	Autism	Autism	Autism
CARS score	51.5	43	45	41	33
Level of PECS	2	3	2	2	Infrequent, as parent requested reduction to using PECS, to improve his speech.
Level of verbal communication	Vocalisation	Vocalisation	Vocalisation	Vocalisation	Limited words (small amount of words).
Level of initiation communication	Very rarely initiates communication with adults. Not at all with children.	Sometimes initiates communication with adults using symbol pictures. Not at all with children. He has behavioural problems and sometimes becomes anxious.	Sometimes initiates communication during plat and breakfast with adults using symbol pictures. Not at all with children.	Rarely initiates communication through symbol pictures. Not at all with children.	Often initiates communication with adults. He makes requests sometimes with single words, mostly during breakfast and 1:1 work.

3.6.4 The sample: Staff

The staff participants were three males and two females, all Saudi nationals. The following section presents a brief profile of each staff participant, including their gender, age group, teaching position, number of years' experience working with children with autism, educational qualifications in autism, personality as an individual, and attitude towards taking part in the AISI intervention. Pseudonyms have been used for all staff members.

3.6.4.1 Haskoor

Haskoor was the most knowledgeable and experienced teacher. Haskoor is a male teacher, with 15 years' experience working with children with special needs in general. He spent seven years working with children who have a learning disability. He then moved to the Autism Centre, where he has worked with autistic children for the past eight years. He is the main teacher and is responsible for one child in the classroom, and for supervising the rest of the children in class as they work with other teachers. Haskoor is the most experienced of the five participants. He holds a Master's Degree in Special Needs with a specialisation in autism.

3.6.4.2 Yusef

Yusef is a male and is also a main teacher at the centre. Yusef has 12 years of work experience, including approximately six years of experience working with children with autism. Prior to this, Yusef had worked with children who have a learning disability. Yusef holds a Bachelor's Degree in Special Education Needs from Jeddah, Saudi Arabia, in teaching children with special needs/learning disability. As an individual, Yusef has a very good sense of humour. Two members of his family are disabled (his brother and his nephew). He said he loved to work with autistic children and try to help them as much as he can because autism is not their fault. His attitude at the pre-intervention stage was very open-minded about using all the techniques. He likes to try new techniques to see how they work, and how they may facilitate and improve the communication abilities of children with autism.

3.6.4.3 Alahadal

Alahadal is a male and is another main teacher in the class. Alahadal has six years of work experience, including two years' experience working with children with special needs, followed by four years' experience working with children with autism. In terms of education, Alahadal holds a Bachelor's Degree in Special Needs, with specialisation in autism. His attitude at the pre-intervention stage showed strong willingness to learn.

3.6.4.4 Wedyan

Wedyan is a female and is a main class teacher. She has eight years of work experience, including five years working with children with autism and three working with children who have learning disabilities. Wedyan holds a Bachelor's Degree in Special Needs. As an individual, she has a quiet disposition, and wants to learn new approaches and strategies. Her attitude at pre-intervention stage was very open-minded. She is well organised in her class.

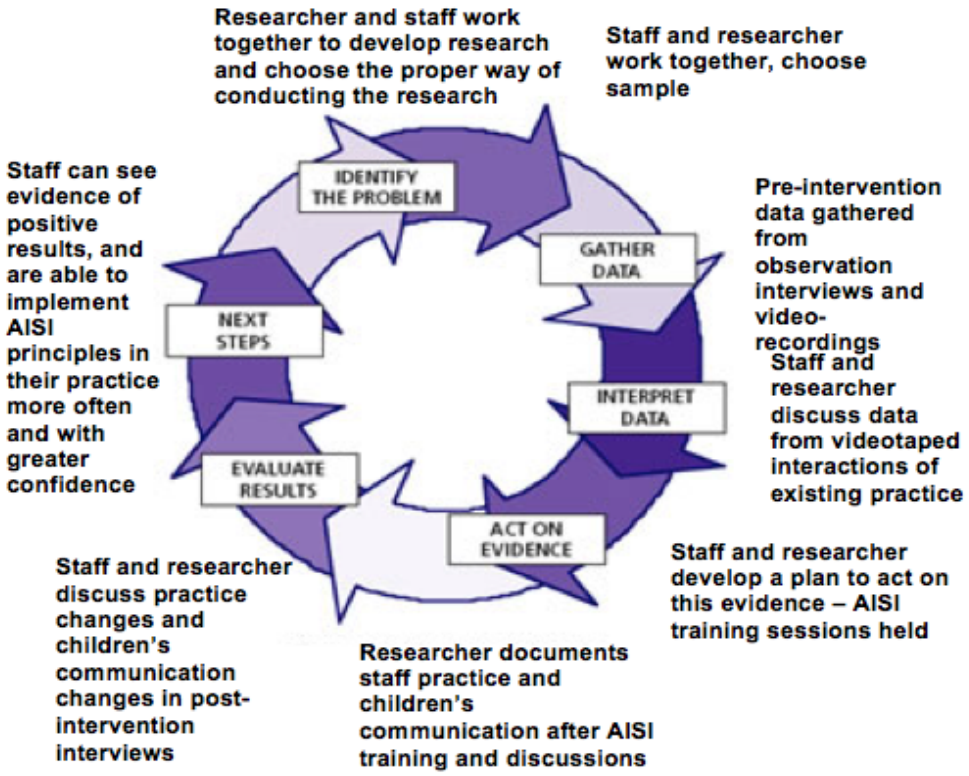
3.6.4.5 Olfat

Olfat is a female. She is another main teacher in the class. At the pre-intervention stage, she had seven years' experience working with children with autism. Olfat holds a Bachelors' Degree in Special Education, and a Diploma in teaching children with autism. As a personality, she loves to play with the children, to provide easy access to the children. At the pre-intervention stage, she said she likes to learn, but expressed that she thought success with an intervention depends on the children: sometimes it is difficult, sometimes it is easy.

3.7 The research methods and sequence of implementation

For the purpose of collecting data, a set of research procedures was developed with the staff. This plan was then put into practice, adhering to the framework of action research by including reflection and revision. The diagram below (*Figure 2*) illustrates how action research works, and keys each step to the activities carried out in this research. It is a cycle where staff and researchers work together to identify and address problems.

Figure 2: Action research cycle as used in this research (adapted from Ferrance, 2000)



As *Figure 2* indicates, action research is a cycle instead of a linear process with a beginning and an end. It assumes that as staff develop competence in practice, they will be increasingly able to reflect on and build upon what they learn. A successful cycle of action research then forms the basis for the next cycle, which may either address other problems

identified during or after the first cycle, concern continual improvement targeted at the same issue as before. While this thesis documents the first cycle of action research, the intention was that staff can now carry out further cycles as part of their journey towards becoming reflective practitioners.

For this project, the researcher relied on current autism research and personal experience of working in autism provision in Saudi Arabia to *identify the problem*. This information was used to develop the research questions in consultation with staff. This process is described below, with reference to the diagram in *Table 4*.

In Pre-phases 1 and 2, the researcher worked with staff to *gather data* through observation, staff interviews, discussions, and video recordings of current practice. The research instruments were tested and the sample chosen, with staff playing key roles throughout. During this phase there were discussions the researcher and staff discussed what form of communication was seen as a good target for the research, settling on initiation of spontaneous communication.

The researcher *interpreted data* in Phases 3 and 4, using the videotapes of good existing practice as examples for discussion. The researcher provided information about AISI in staff training sessions to assist interpretation. During this phase, staff members and the researcher identified good current practice and developed a plan together to act on changes.

In Phase 5, staff were able to *act on evidence* gained during Phase 4, implementing AISI principles for 8-10 weeks. The researcher collected data during this phase to document

staff action, and during the discussions the staff and researcher discussed key points of AISI and reflected on their practice as well as raising issues.

Staff began to *evaluate results* to some extent during Phase 4, as they discussed successes and problems together, and with the researcher, on a regular basis. More formal evaluation occurred in Phase 6, and the researcher and staff used this information to decide what the *next steps* should be based on the results of their action research. The high degree of involvement of school staff in the research allowed evaluation and practice change to occur during the study, not just at the end. For example, after the pre-intervention videos were recorded, the researcher assessed the footage to ascertain which AISI principles the staff were already using. These videos were then edited and presented to the staff to illustrate current good practice, foster discussion of further implementation, and discuss potential difficulties. This practice was inspired by video interactive guidance (Kennedy, 2011). A substantial contribution was made by the staff in all research phases, enabling a democratic partnership to form between the researcher and the staff. This was empowering and enabling to both parties, as recommended in numerous studies (McNiff and Whitehead, 2006; Denscombe, 2010). *Table 4*, following, provides more detail about the steps taken during each phase of this action research process.

Table 4: Sequence of implementation

Research phase	Stage	Action taken
Pre-phase 1 (2 weeks)	**1**	Observation: note-taking and reviewing assessment conducted by the school. Observations focused on: - Children's spontaneous communication - Staff interaction or behaviour when working with children
Pre-phase 2 (3 weeks)	**2**	Review of research instruments and initial data gathering: - Semi-structured interviews with staff - Checklist for the Initiation of Communication in Children with Autism (CICCA) for coding spontaneous communication by video recording one child; accuracy check. - Adult Interactive Style Coding Checklist (AISCC) for coding staff behavior by video recording one staff as sample; accuracy check. - Reviewed child assessments completed by staff at the school, which are based on school assessment (unpublished).
Phase3 Implementation (4 weeks)	**3**	– Video recording: five staff and five children, 3 activities. – Modified video in which AISI principles were seen in action, and found positive and good footage to categorise it under AISI principles from their own footage.
Phase 4 (1 week)	**4**	– Researcher delivered three lectures to the staff using adapted video to train them in how to use AISI principles, and explained and discussed the AISI intervention. Showed them video of their own practice in which the AISI principles were seen in action. – During the training lectures, teachers commented that they previously applied AISI principles erratically
Phase 5	**5**	– Staff practiced these principles with their children for 8-10 weeks. – Researcher attended class and made notes in relation to interaction between staff and students with autism to make sure the AISI learning principles were applied and to observe the quality of engagements they elicited. – Discussed with staff after the class finished or at the end of the day if the staff was not engaged to make field-work notes regarding their AISI practice and to encourage them to reflect on their practice with children, their difficulties, and how they saw AISI principles and working with them.
Phase 6 Post-intervention(3 weeks)	**6**	– Video recording took part for the five staff and five children as post-intervention – Semi-structured interviews as post-intervention to reflect their experience and practice and assess the use of AISI principles in their practice. To see what principles works with them and what principles do not work with them.

3.8 The researcher's role

Action research is about helping people to develop better practice (Thomas, 2011; McNiff *et al*. 1996; Somekh, 2006), which in this study meant improving the practice of staff in facilitating spontaneous communcation. This required working very closely with the staff to reflect on and enhance the way they used the AISI principles in their work context.

Gold (1958, cited in Cohen *et al*., 2007) describes four different observer roles that researchers can take: complete participant (observer as a member of the observed group), participant-as-observer (the observer participates in activities, but can ask the other participants questions to clarify what is going on), observer-as-participant (the observer does not take part in the activities but his/her status as a researcher is known to the participants), and complete observer (participants are not aware that they are being observed).

My role in this study was of the participant-as-observer. It is this role that distinguishes the present study from several previously conducted studies (Stone and Caro-Martinez, 1990; Stone *et al*., 1997; Keen *et al*., 2002; Chiang *et al*., 2008; Agius, 2009; Chiang, 2009) where the researchers acted passively and only described the situations that they observed. In these studies, the researcher-as-observer role was chosen because, as a complete participant, the researcher could have a greater impact in the outcomes. However, it was recognised that this role could potentially bias the findings, whereas acting as a complete observer raised ethical issues and was impractical under the circumstances. The research involved staff working one-to-one with children or interacting with individual children while they were in small groups, such as while eating. To reduce observer effect, minimal interaction with the staff was also established.

The action research paradigm values practitioners thinking for themselves and making choices (Thomas, 2009). However, this presented an immediate challenge for this particular study due to the cultural context in which the work was carried out. Saudi Arabia is an authoritarian culture with traditional values that are resistant to sudden change, especially when there is an attempt to impose change from outside. Both mainstream and special education settings in Saudi Arabia have hierarchical structures that are authoritarian in nature, both in terms of teacher-child relationships and management-staff relationships. Staff expected the researcher to tell them what should they should be doing rather than having a kind of collaboration within which they could easily tell the researcher what they felt comfortable with. They were also less confident about trying new things than staff might be who work in a less authoritarian culture, even when given 'permission' to do so by the researcher. This raised potential ethical concerns for the research, as although staff were not likely to experience observation and discussion with the researcher as *"oppressive supervision"* (Gibson *et al*., 2014), as it was less directive and hierarchical than the supervision they were used to on a daily basis, they could feel coerced into agreeing to take part in the research simply because management had approved it. Also, staff might be worried about changing practice because of how it could be perceived by management, or might not be honest with the researcher about workplace pressures that derive from power differentials. That said, power that derives from expertise can be used in an ethical manner: *"Ideally, the more powerful individual guides the person below him or her in terms of developing, training, or support"* (*ibid*.: p. 3).

Assuming this role presented an interesting challenge for me as a researcher, as my aim was to involve the participants and work together as colleagues towards a shared goal,

rather than being the external 'expert' telling them what to do. By necessity, I had to play a dual role to encourage them to collaborate as much as they could. Because an authoritative role is what they expected from me, at times my approach had to be more directive (for example, during the pre-intervention stage), although my direction was aimed at encouraging collaboration, openness, and self-reflection. For my research, teamwork and collective thinking about the issues to be solved was a vital aspect, and could only be achieved through empowerment of the participants to *"develop ideas and speak more widely on the issues raised by the researcher"* (Denscombe, 2010: p. 156). Therefore, I needed to be clear about the nature of my role, without weakening their confidence in me as a person who could bring something valuable to their busy work lives. An alternative approach would have been to act as an outside 'expert' with a didactic role, but as noted earlier, there is resistance to change in traditional Saudi school cultures. Lasting, embedded change seemed less likely to derive from direction by an outside 'expert' than from collaborative action research in which the researcher provided leadership aimed at supporting participants to develop their own skill and confidence, despite the difficulties this approach would encounter.

Several studies (Stone and Caro-Martinez, 1990; Stone *et al*., 1997; Keen *et al*., 2002; Chiang *et al*., 2008; Agius, 2009; Chiang, 2009; Kossyvaki *et al*., 2012) stated that the researcher should adopt the role of observer-as-participant, because a *"pure observer"* approach could alienate him from his research sample. The staff were accustomed to supervisors observing their performance and judging their skills. In order for the collaborative nature of action research to work successfully, it was vital to prevent a manifestation of the dynamics of supervisor-staff hierarchy.

In addition, measures were taken to assure that a purely passive observer role was avoided, whilst minimising direct impact on staff-child interactions by the researcher. This was a delicate balance. First of all, video was used in order to allow external control regarding reliability of data. Moreover, the use of other methods further reduced the possibility of such a scenario. As the children were presumed to react to the researcher's presence during class, it is often suggested that he or she should *"become a part of the furniture,"* i.e. minimise their impact (Denscombe, 2010). The interaction between the researcher and either the staff or the children was kept as low as possible during the recording sessions to minimise the observer effect. In some situations, the camera was even hidden separately, whilst the researcher was only taking notes, to minimise any impact on the children. Sometimes the researcher put the camera behind a partition, allowing capture of all the children's and staff behaviour. *Tables 5, 6, 7* and *8,* below, provide additional information about these observations.

3.9 Methods for collection of data

The following section presents the three key methods used for collecting the research data, which are as follows:

- Video footage of three activities involving five staff members and five children, which was formally analysed by the researcher and an outside evaluator, and discussed with staff.

- Semi-structured interviews conducted pre-intervention, during the intervention, and post-intervention, concerning the staff's overview of interaction and children's progress,

- Evaluation assessment completed by the researcher, comprising the fieldwork notes

Increased attention is paid to the ethical issues that might be incurred by each of these research data collecting methods.

3.9.1 Video data collection

Determining a child's intention to communicate is often difficult. This study required data concerning various communication features–specifically, functions, methods and intent–that are hard to collect solely on the basis of field notes. Furthermore, data concerning the interaction style of adults was also required. This would pose a great challenge when taking notes, as it is not possible for a single researcher to pay adequate attention to both children and staff at the same time. Thus, collecting video footage enabled the researcher to analyse communication during an activity separately for each participant. The following section presents the methodology of video footage collection.

There are multiple advantages and disadvantages of video footage. The possibility of examining data repeatedly (Heath *et al*., 2010) is perhaps the most advantageous aspect. Multiple researchers can analyse footage individually and thus make the analysis more reliable. Moreover, video recording is an item with a *"longer shelf life"* compared to data of other kinds (Stingler *et al*., 2000: p. 4). The footage from previous studies can be examined again in light of more recent theories. Due to the fact that video footage can be accessed by a wider range of research analysts (particularly those who lack sufficient knowledge to interview certain target groups), it can support interdisciplinary research (Stingler *et al*., 2000).

The main limitation of video footage is in what the researcher is able to record. The

demonstrated situations can thus be unrepresentative of the usual state, and the researcher is obliged to consider this fact. The 'camera effect' is another aspect to be taken into account (*ibid.*). Staff members may tend to present their best sides, whilst both children and staff may behave differently due to excitement or embarrassment. Staff with limited ability cannot cover this up during video recording, however. Data may be lost because of equipment failure. The position of the camera is important, together with sound and light issues. Creating the right conditions for high-quality video capture may create an artificial situation, with an impact on the human interactions that could confound results.

Ethical concerns involve gaining consent from both staff members and parents on behalf of their child for video recording, which tends to deter the participants (Heath *et al*., 2010). The parents may be worried about being criticised for the way their children behave, whilst the teachers may be afraid that the video will be shown to their superiors, who might be assessing their performance, an act that may affect their progress.

According to Heath *et al*. (2010), video is an appropriate tool for observing the non-verbal features of human behaviour (in terms of communication, this includes eye contact, gestures and body language). It has been proven that the social skills of autistic children can be best assessed through actual observation (Clifford *et al*., 2010). Instead of gaining information indirectly by questioning parents or teachers, the use of video footage provides access to direct information regarding actual situations (Robson, 2002; Cohen *et al*., 2007). This is a very important conclusion, as the teachers may often perceive their performance in a different manner to what it actually is.

In this study, video footage was taken in the classroom and in the Breakfast Area (which was more difficult, as it is an exterior space). The interior environment allowed the

researcher to control a variety of aspects such as noise and session duration. Videotaping in two different environments allows researchers to see if environmental factors are playing a crucial part in facilitating or inhibiting spontaneous communication. During a regular school day, children participate in several activities, some of which are more stimulating in terms of spontaneous communication compared to others. The evaluation of the extent to which the stimulation typically occurs is inconclusive. There are studies (e.g. O'Reilly *et al*., 2005; Chiang, 2008b; Chiang, 2009), which claim that school activities tend to evoke spontaneous communication. However, according to other studies (e.g. Stone *et al*., 1997; Potter and Whittaker, 2001), spontaneous communication is more significantly supported by unstructured activities.

For the purpose of video recording data for this project, three activities were therefore selected. According to SCERTS instructions (Prizant *et al*., 2006), representative data regarding the socialisation of children with autism (whose language and communication skills are limited) can only be obtained from a variety of activities. The selected activities were breakfast, unstructured free play, and one-on-one (1:1) interaction with an adult.

The breakfast activity most commonly occurs in the designated outdoor breakfast area. If the child appears to be having a bad day, breakfast takes place in the classroom to avoid nervousness and help keep the child calm. Unstructured free play is an activity that can generally be described as motor-based and child-directed. Other children and staff are present in the same space during both breakfast and unstructured free play activities, providing a range of potential communication partners. The main objective is to develop communication and interaction among children (through instruments such as turn-taking, initiations, anticipation etc.). There are separate, quiet premises specially designed for these activities. As for the 1:1 work, it takes place in the regular classrooms. These 1:1

activities can be described as structured, sedentary, and adult-directed, and often occur in a distressing environment. Based on the previous study elaborated by Kossyvaki (2012), four activities–sensory room, soft play, snack time, and 1:1 work–were selected and recommended. However, in this study, only three activities were chosen due to the school's limited resources: the sensory room had been removed because it was under refurbishment during the time in which the research was conducted.

3.9.2 Adult: child ratio

The size of a regular class at the Autism Centre ranges from three to five pupils, supervised by two or three adults. The majority of activities are conducted as 1:1 interactions between a child and adult, with some exceptions, i.e. small-group activities facilitated and led by staff.

According to Prizant *et al*. (2006), it is important to observe children with autism whose language and communication skills are very limited in at least two of the following settings: 1:1 work, smaller group, large group. Some studies have concluded that spontaneous communication mostly occurs during 1:1 sessions and activities for smaller groups (Potter and Whittaker, 2001). Consequently, the recorded activities were conducted in these settings. The adult-to-child ratio was 1:2 during both unstructured free play and breakfast, as during breakfast all staff are sitting in the Breakfast Area. The staff were asked to focus on a certain child when interactions were video-recorded.

3.9.3 Length of video recordings

Several communication-related studies gathered data from child observations of variable time-spans. For example, the observations by Silva *et al*. (1980) took 20 minutes per child.

Furthermore, they tried both longer and shorter time-spans, but came to the conclusion that 20 minutes is a sufficient time period to collect the required data whilst not exhausting the observer. It is necessary to mention that their study involved children with typical development.

Observations of autistic children require longer periods of time, partly because the limits of children's spontaneous communication sometimes mean that longer observations are needed to capture enough examples of communication. In their study, Stone and Caro-Martinez (1990) performed two-hour observations of each of their sample children. The observations by Hauck *et al*. (1995) occurred in four sections, each with a 15-minute duration, performed on separate days. The video recordings of the children's spontaneous communication used by Potter and Whittaker (2001) were acquired during a whole day of school, individually for each of the participants. The participants of the study by Chiang and Lin (2008) were recorded for two hours. According to Prizant *et al*. (2006), conclusive data can only be obtained if the observation lasts at least two hours. Furthermore, they suggest that the footage should be acquired on at least two separate days.

In this study, the researcher therefore discussed the existing research regarding the optimal duration of observation with staff, and agreed with them the duration. Following discussion, it was agreed that observations should last 40 minutes for each of the five children during each of the three activities. The first stage indicated that the activities lasted approximately 40 minutes. Consequently, three sessions were recorded for each activity, in order to obtain two hours of footage of each member of staff. During stage two, which occurred two months later, the same activities were recorded for the same amount of time. The number, length and time-spans for each of the three activities and each child

(pre- and post-intervention) are shown in *Table 5* and *Table 6*.

Numerous studies focusing on interaction between children and adults have used identical video tools for the analysis of both groups' behaviour (Hwang and Hughes, 2000; Doussard-Roosevelt *et al*., 2003; Ruble *et al*., 2008; Kossyvaki, 2010). Extracts of video recordings from previous studies were utilised in order to assign a code to the interactive style of the staff and each member of the staff during 120 minutes of pre- and post-intervention activity. They were selected randomly from 20 minutes for each of the activities in which the children were filmed (breakfast, unstructured free play and 1:1 work.) Pre- and post-intervention video recording was carefully scheduled due to limited time. It had to take place within no more than two semesters because the researcher was concerned that children or staff might leave the school. Also, doing research abroad can be difficult to manage regarding time and travel.

Table 5: Length of Pre-intervention observations for each (child)

***Table 5*: Length of Pre-intervention observations for each (child)**			
Timeline	**4 weeks**		
Activities	***Length of each session videotaped***	***Number of sessions videotaped over a 4-week period***	***Total length of activity videotaped***
Breakfast	10	4	40
Unstructured free play	10	4	40
1:1	10	4	40
Total	30	12	120

Table 6: Length of Post-intervention observations for each (child)

***Table 6*: Length of Post-intervention observations for each (child)**			
Timeline	**4 weeks**		
Activities	***Length of each session videotaped***	***Number of sessions videotaped over a 4-week period***	***Total length of activity videotaped***
Breakfast	10	4	40
Unstructured free play	10	4	40
1:1	10	4	40
Total	30	12	120

Table 7: Length of pre-intervention observations for each (staff)

***Table 7*: Length of pre-intervention observations for each (staff)**			
Timeline	**4 weeks**		
Activities	**Length of each session videotaped**	**Number of sessions videotaped over a 4-week period**	**Total length of activity videotaped**
Breakfast	10	2	20
Unstructured free play	10	2	20
1:1	10	2	20
Total	30	6	60

Table 8: Length of post-intervention observations for each (staff)

***Table 8:* Length of post-intervention observations for each (staff)**			
Timeline	**4 weeks**		
Activities	**Length of each session videotaped**	**Number of sessions videotaped over a 4-week period**	**Length of activity videotaped**
Breakfast	10	2	20
Unstructured free play	10	2	20
1:1	10	2	20
Total	30	6	60

3.9.4 Interviews with staff

The researcher conducted five semi-structured, one-to-one interviews with the five teaching staff members. Each interview lasted between 45 and 60 minutes, and was conducted in a quiet room at the autism Centre pre- and post-intervention. The purpose of the pre-intervention interviews was to find out about staff members' current training level and practices, to discuss their ideas about communication problems they experience with

the children they work with, to assess their attitudes to learning this new style, and to see what approaches they typically used.

The five Saudi staff who completed the two-month AISI training intervention at the Autism Centre also completed post-intervention exit interviews with the researcher to reflect their experiences of applying the 13 AISI principles and 9 communicative opportunities for communication with the same children. This was done in order to explore any changes in the teachers' perceptions during the intervention, and to evaluate their willingness to continue using the principles in the future.

3.9.5 Researcher field notes

The researcher took extensive field notes during the research process (see *Appendix 21* for a sample of how these were coded). These included descriptions of the interactions between children and staff observed during the implementation of AISI. The researcher used a staff evaluation checklist during this process (see *Appendix 4*). Field notes were also taken that recorded the contents of discussions with staff, which were held on the same days as staff were observed and/or filmed working with children. These discussions were intended to remind the staff about AISI principles and to provide them with time to reflect on their activities, successes and difficulties. This was a part of training process to monitor how the AISI principles were implemented. In this way the researcher and staff could check that principles were being implemented correctly.

3.10 Piloting the video recording

In the piloting phase of the recording sessions, a number of decisions essential to the research were made as a result of consultation with the staff members. They were mostly related to the recording device, its position, choice of particular activities to be recorded, and the researcher's role. Aside from the researcher, two participants, i.e. one staff member and one child, were involved in the piloting stage.

A Sony HRD-PJ660 video camera capable of making high-resolution, 20.4 Mpx video was purchased by the researcher for the purpose of the study. Several arguments were found that support the choice: the device was lightweight, both visual and sound quality of the recordings was excellent, and its brand was reliable. The sessions were recorded at the highest resolution the device enabled. In order to prevent degradation of picture quality, optical zoom was set prior to recording.

It was necessary to decide whether the camera position was to be fixed (Heath *et al*., 2010). As using a tripod may cause accidents, the researcher decided to hold the device himself during most of the unstructured free play and breakfast sessions, as well as during the 1:1 sessions. This decision also made the recording process more flexible. Nevertheless, it was problematic to position the device. Important data might have been lost, as both the staff members and children were constantly moving. Various camera positions were tested. Although positioning the device to directly face the children was the most suitable alternative, some children reacted negatively if they felt their space was intruded on by the device. On the other hand, if the camera stood behind them, the video failed to capture a significant amount of data, e.g. eye contact, smiles, or eye-pointing. A compromise solution was to record from the side (as is also suggested by Sylva *et al*., 1980, and Robson, 2002). A distance of 1-2 meters was kept between the researcher and

the small groups or staff-child pairs, and eye contact was avoided

The researcher selected three activities for the sessions. Nevertheless, the piloting phase showed that it was not always possible to record all the activities – for instance, significant ethical issues would arise if the recording area could be accessed by anyone or if staff or children who were not a part of the research group were recorded. It was also crucial to decide how to divide the 40 minutes of recording among the activities. In the piloting phase, an activity on average required 10 minutes. After discussing the matter with the staff, it was decided to divide the recording session into four equally long parts. The staff considered such a setting convenient, and also thought it would accurately reflect the level of interactive communication. The problems with concentration that the children had also affected the decision, as they were usually not able to concentrate for periods exceeding five minutes. In conclusion, the piloting phase proved the necessity of modifying the original plan for the study to deal with the limitations and possibilities of the Autism Centre. This is in accordance with the researcher's view that conducting research in an Autism Centre environment requires the researcher to respect and flexibly adapt to the schedules of participants and their various commitments (BERA, 2011).

3.11 Video data coding

According to Hopkins (2002), two kinds of observation exist: open observations (during which the researcher takes notes on a blank piece of paper) and focused observations (during which the researcher makes notes in reaction to a specific event or feature of behaviour that has been pre-determined). A third kind of observation was introduced by Cohen *et al*. (2007) to fit between the strictly structured and strictly unstructured observation: the semi-structured observation (which is predetermined to a certain degree).

In this section, the analysis and recording of the captured data is discussed. Several important decisions were required at this point: determining the necessary amount of footage; categorising the children's spontaneous communication according to frequency, functions and methods; and classifying the staff member's behaviour based on the interactions that applied AISI principles. As for the necessary amount of footage, the determined duration was 40 minutes for each of the children during each activity, both pre- and post-intervention. As noted previously, the chosen amount of footage is similar to previously conducted studies of this kind. The duration of adult-interaction footage was also considered adequate, as the style could be further triangulated by the researcher (for example, through the semi-structured interviews and evaluation assessment). Furthermore, there was an extensive amount of video footage that required analysis.

Observation checklists were created for use in gathering data from the video recordings in a systematic way. These were based on previously conducted research (Stone and Caro-Martinez, 1990; Keen *et al*., 2002; Roos *et al*., 2008, Kossyvaki, 2010), and enabled categorisation of both children's spontaneous communication and the staff's interaction skills. The Checklist for the Initiation of Communication in Children with Autism (CICCA; Kossyvaki, Jones and Guldberg, 2012) (see *Appendix 1*) includes 16 methods (e.g. eye contact, simple motor action, challenging behaviour) and nine functions (e.g. request and reject) of communication. The communicative methods are categorised as either pre-symbolic or symbolic, and functions were classified into three categories (behaviour regulation, joint attention and social interaction). The function and methods of each behaviour that met the criteria of spontaneous communication (as defined by Potter and Whitaker, 2001 and Bogdashina, 2005) were coded using numbers to indicate the order in which the child used them. For example, if a child used eye contact and a simple

motor action to request, the researcher recorded both boxes in the request column in the order in which they were used. CICCA codes were used to form a scale that showed the children's use of each feature. The AISCC (Adult Interactive Style Coding Checklist), was used to measure the frequency of using AISI principles by staff (see *Appendix 3*). The researcher had intensive training via sessions delivered by Kossyvaki in 2013 regarding both AISI principles and checklist coding.

Although similar in terms of the level of structure, the CICCA and AISCC are significantly different. In the CICCA, the binary model of spontaneity was the basis, whilst the development of the AISCC followed the continuum conceptualisation of spontaneity (Chiang and Carter, 2008). The former approaches spontaneity as an all-or-none act and makes no distinction between the terms 'spontaneous' and 'initiated' communication (Carter and Hotchkis, 2002). Rather than describing acts of communication as either spontaneous or non-spontaneous, the latter model proposes observing individual communicative attempts and determines a degree of spontaneity according to the intrusiveness of the antecedent stimuli (Kazmareck, 1990; Carter and Hotchkis, 2002). Spontaneity of a communicative attempt increases with the decrease of stimuli intrusiveness.

'Spontaneous communication' has been defined differently by various researchers. Taking into account the participating children's young age and the difficulties that they experienced when trying to communicate, the study utilised a very liberal definition suggested by Potter and Whittaker (2001): each of the children's actions that occurred *"without verbal prompting from adults"* (p. 25) was considered a spontaneous communication intent. The definition of the act of communication provided by Bogdashina (2005) was another useful theorem: according to her, the act of communication has several

pre-conditions, namely a subject to communicate, a sender, a receiver, a transmission medium and intent. Each of the functions and methods of communication was given a definition (see *Appendix 2*), in accordance with previously conducted studies. The checklist was piloted with the same sample of participants to make sure the selected research methods were feasible (Blaxter, Hughes and Tight, 1996).

3.12 Reliability checks

The reliability check was performed by two postgraduate-qualified students, who were chosen because they had previous experience with teaching SEN children and their first language is Arabic, the main language used in the school. They were unaware of the study's objectives and the order in which the videos were made. The two observers were trained in CICCA separately, and took between two to three days of training (each with his own sample) until they reached 80% agreement. Afterwards, each of the observers separately coded a randomly-chosen 20% of the video samples. These numbers regarding the minimum amount of sessions to check for reliability were recommended by Reichow *et al*. (2008). An 83% inter-observer reliability agreement (ranging from 80% to 87%) was reached for the total number of initiations. A 78% inter-observer reliability agreement (ranging from 72% to 84%) was reached for the communicative functions and an 84% agreement (ranging from 80% to 88%) was reached for the communicative methods. These numbers exceed the 80% recommended by Reichow *et al.* (*ibid*.).

As noted previously, the AISCC was also used to measure the implementation of AISI principles by the staff members' post-intervention. The present study follows the experience sampling methodology, i.e., a specific mark was made for each observation of an AISI principle. After each video recording session, frequency of their use of AISI

principles to facilitate spontaneous communication was evaluated (See *Table 8* for the recording sheet used) in accordance with Kossyvaki (2012), a study in which this process was tested.

A postgraduate student who was also a teacher with a qualification for teaching SEN children, and who had no knowledge of the study objectives, was asked to participate in the recording sessions in order to verify the AISCC's inter-observer reliability. She was trained during isolated video sessions until the required 80% compliance rate was achieved. From all the video samples of adults, she recorded 25% (i.e. one hour of the four-hour footage) by herself, exceeding the minimum session length of 20% as recommended by Reichow *et al*. (2008). The interobserver reliability compliance reached 87% (ranging from 80% to 93%), thus meeting the criteria for 80% minimum as recommended by Reichow *et al*. (*ibid.*).

In conclusion, both the CICCA and AISCC provided quantitative data that could then be triangulated with the qualitative data obtained from observations, discussions and interviews to achieve the balance necessary for the mixed-methods approach (Creswell, 2003; Teddlie and Tashakkori, 2003; Creswell and Plano Clark, 2007). Qualitative data was obtained by means of semi-structured interviews with members of the staff. The interview schedules used can be found in *Appendix 6*.

3.13 Application of the Adult Interactive Style Intervention (AISI)

After the pre-intervention stage, data from video sessions with children was gathered (Stage 3), it was analysed to evaluate the interactive style of adults and determine the principles that aided children's communication. Afterwards, the recordings were adapted

and shown to the staff, allowing them to see the AISI principles in action during their own existing practice.

These videos were the cornerstone of the staff training provided in the AISI intervention. In a lecture, the researcher explained and discussed the AISI intervention. Staff discussed the videos of practice, using what they learned about AISI to identify existing good practice. Staff provided their own ideas about how these principles could be used in everyday classroom practice, and discussed how the study could be carried out with minimal disruption to their children and classrooms. During this period staff began to bring up questions and ideas based on other training they had received and past work experience. While at first the researcher was usually answering questions, over time staff began to offer their own ideas more readily and ask each other. Through these training sessions, the action research group derived cohesion, and the action research cycle plan was developed.

Within the practice period, discussions were held five times weekly between the researcher and staff regarding good practice, difficulties with implementation, and further instructions, to make sure that the implementation was fully understood and properly implemented. These included both action research group sessions and individual after-work sessions in which one member of staff and the researcher talked about that day's practice.

The AISI is comprised of 13 universal principles and nine communicative opportunities, which were agreed on as the most efficient in terms of stimulating spontaneous efforts to communicate. The principles and eight of the communicative opportunities were developed by Kossyvaki *et al.* (2012). In the present study, these principles were applied in

a different setting, with staff and children from a different culture and linguistic background, and with children in an older age group to that of the previous studies, and their effectiveness was evaluated for this specific set of circumstances. A new communicative opportunity was added. In this setting, prior to the study, AISI principles were not recognised, and so they were not applied systematically.

Special training related to Video Interaction Guidance was attended by the researcher in Northampton in 2014. In her previously elaborated study, Kossyvaki (2012) used Video Interaction Guidance (VIG). In order to train the staff in ways of implementing the AISI principles, the Video Interaction Guide according to Kennedy (2011) was adopted. The main aim of this type of intervention is to improve the communication between the parents and the child, and to further develop the skills they have already acquired. In Kennedy's study, parents watched video footage of interaction, and received successive instruction concerning its most important elements and the principles that achieve the most notable outcome. Such methodology aims to improve the parents' interactive style in their role of mentors, as well as the responses from the mentored children. During the sessions, the parents are motivated to *"become as active as possible in experiencing and thinking about their own change"* (*ibid*.: p. 31).

The VIG was therefore considered a suitable tool for use in this study, although in this case it was used with staff rather than parents. One of the objectives was to base the progress of the research on the experience the staff members had acquired prior to the study. Through providing them with positive feedback on their performance during their video sessions (specifically, their intuitive implementation of some AISI principles), the motivation of the staff members to focus on implementing the principles increased: they could see that they

already had some competence with parts of the intervention, and could see that it had an impact. This demonstration of existing partial competence gave staff participants more 'ownership' of the intervention method than would have been the case had AISI been presented to them as an entirely new concept brought in by an outside expert. With more practice of the use of the principles, their self-confidence in the interaction also increased. The action research cycle of identifying issues based on current practice, gathering data with staff while they carry out day-to-day work, interpreting data within a partnership between staff and researchers, acting on evidence through practice change, and then using the data collected about that action as the basis for evaluation fits well with the VIG approach.

3.14 Implementation and evaluation checklist with field notes

In order to perform high-quality research, a considerable amount of effort was put into ensuring the accuracy of implementation (Jones and Jordan, 2008). According to Kasari (2002), accuracy checks should be used to evaluate the extent to which the implementation adheres to the requirements. Different kinds of internal and external accuracy checks can be used (O'Donnell, 2008). Firstly, it is possible to appoint an observer who provides feedback and an overall rating regarding compliance with principles. An evaluation checklist, when combined with field observation of accuracy, tends to produce more accurate data overall (Emshoff *et al*., 1987).

Evaluation methods were chosen for this study. Firstly, the video recordings were analysed to assess the level of compliance with the AISI principles by the researcher. Moreover, the researcher attended to observe the staff and filled in a staff evaluation checklist (see

Appendix 4) designed to determine the frequency of AISI use, and discussed with staff at either at the end of the class or the end of the day if the staff had not engaged. The checklist also helped to remind them of the principles and reflect on their practice, any difficulties, how they felt about the principles, and whether they were easy to implement or difficult. In order not to increase the workload of the staff, the researcher observed and filled in the evaluation checklist during their AISI practice. The form offered three broader categories of answers, specifically 'not at all', '1-5 times' and 'many times.' In this stage of observation and discussion with staff, the researcher wrote down what he noted and also how the staff themselves reflected on their practice.

3.15 Semi-structured interviews

According to Bernard (1988), many researchers support the use of semi-structured interviews, as they provide the opportunity to prepare the questions in advance, thus allowing the interviewer to appear organised and competent throughout the interview. Unlike a purely structured interview or questionnaire, which may constrain responses, semi-structured formats also permit researchers to follow up on responses that may open up new lines of inquiry. Semi-structured interviews give informants the freedom to express their views in their own terms, and to reflect their opinions about the intervention or the topic they have been practicing. They provide an opportunity for interview subjects to introduce new topics and to emphasise what is most important to them.

Semi-structured interviews can provide reliable and comparable qualitative data. The interviews conducted in this study were, both pre-intervention and post-intervention, semi-structured. The interview questions were piloted with a qualified academic who worked

with autistic children in Saudi Arabia, and we agreed on the questions to be asked of the staff who participated in this study.

In an action research study, pre-interviews with participating staff are crucial. They give staff a forum to identify problems, provide data about their aptitudes and attitudes, and discuss the ideas they have to address problems. Pre-interviews with five staff members of the facility working with autistic children also helped to address research question 4: *to what extent are adults able to change their interactive style?* In order to explore the changes in the teachers' interactive style, it was essential to understand the regular codes of practice and the dominant approach used for teaching autistic children in the Autism Centre (before the implementation of the AISI intervention). In addition, the purpose of the baseline interviews was to explore the teachers' openness to adopting new ideas and adjusting their interactive style. By means of exploring dominant approaches and personal attitudes, it was possible to attain a clear and accurate picture of teaching practices within the Autism Centre, and reveal the gaps in the teachers' knowledge. Moreover, it was possible to identify potential barriers that may impact on implementation of the AISI intervention, which may have otherwise been overlooked.

Post-intervention interviews were conducted with the same staff as in the two-month training phase, where they completed interviews with the researcher to reflect on their experiences of applying the 13 AISI principles and nine communicative opportunities for communication with the same children. This was done in order to explore the possible changes in the teachers' perceptions during the intervention and to evaluate their willingness to continue using the principles in the future. They were a key part of the process of evaluating the study's results.

Both pre- and post-intervention interviews took place in a quiet room, their duration being between 40-50 minutes. A digital recording device, selected for its discreet nature and high sound quality, was used to record all interviews. Interviews were then transcribed using a standard word processing programme. Each interview was transcribed using the exact words of the participants. The interview schedules used can see found in *Appendix 6*.

Because semi-structured interviews frequently include open-ended questions and the conversations may deviate from the interview guide, it is usually best to tape-record the interviews and transcribe them for later analysis. For these interviews, transcription was followed by translation, as interviews were in Arabic and the researcher translated the transcripts of these into English. Translation was then reviewed by an external agent for approval. The reason for translation was to make it easier to conduct thematic analysis for a thesis written in English.

3.16 Interview analysis

Thematic analysis is a widely-used qualitative data analysis method. Thematic analysis involves examining a data set to discover recurring patterns of meaning, and gives the researcher flexibility to respond to the data rather than using preconceived assumptions (Braun and Clarke, 2006).

The interview data was coded manually using Excel spreadsheets to collect and organise information. The spreadsheets were set up to capture responses to each question, with the categories keyed to the themes of the questions in the interview schedule (*Experience, Knowledge and understanding,* etc.) The thematic analysis process began after all the interviews were fully translated and transcribed.

The aim of qualitative analysis was to identify key themes in the responses to questions across all five interviews pre- and post-intervention, and to investigate the dynamics within each theme. This process started with the identification of the themes included within each interview. Each theme that emerged was illustrated with a representative quote.

The researcher began with a 'deep reading' of each transcript. In using the term 'deep reading,' the researcher is emphasising the extremely thorough method of the reading, which surpasses a basic reading for the grasp of content. The researcher repeatedly read each transcript section-by-section, so as to gain a clear understanding.

During this process, the researcher carried out a preliminary coding of the data. At this stage, the intention was simply to identify all the major themes within the data. Once the interviews were transcribed, answers were added to the spreadsheet and descriptive codes were generated from their content. For example, in the pre-intervention interviews, if the teacher responded to a question about training by saying they had previously received PECS training, the code "PECS training" was added. Colour coding was used to make it easier to find information within the spreadsheets.

As a result, this process identified a number of various themes, some of which were common amongst most or all of the staff members. The Excel spreadsheet was used to organise themes to see which were common to all/most, and to note whether certain themes were emphasised heavily by interviewers.

3.17 Ethical considerations

As the study involves vulnerable individuals (children and young people with disabilities), the following section addresses ethical issues related to the research. Moreover, when a recording device is used in a classroom, there are significant ethical concerns that require attention (Heath *et al*., 2010). Restrictions based on ethical concerns are referred to as *"rules of conduct"* (Robson, 2002: p. 65). These are designed to determine whether a particular pattern of behaviour is acceptable in social terms. Otherwise stated, it is the responsibility of ethical researchers to protect the comfort and interests of research participants and prevent any harm that might be done to them (Lankshear and Knobel, 2004).

The University of Birmingham's Ethical Review Committee granted the researcher ethical approval prior to the beginning of the study. The ethical review application can be found in *Appendix 9* (Application Ethical approval no: ERN_12-1115), and the letter given to parents to gain their informed consent for their child to take part in the study is in *Appendix 10*. The letter was translated into Arabic.

Participating staff of the specialist school in Saudi Arabia were asked for their informed consent. Each adult staff participant received a consent form (see *Appendix 11*). The consent form informed the participants about the researcher and the aims of the study, and assured them of their right to withdraw their participation at any stage.

It would have been theoretically possible but difficult to gain the assent of the children who took part, because of their young age, cognitive impairment, and communication difficulties. In addition, the children were not undertaking new activities, but were participating in breakfast, unstructured free play and 1:1 activities with staff as before the

research began. These activities were part of their education plans. As accepted by the Ethics Committee at the University of Birmingham, at no time were the children at any risk of harm, and when they were distressed for any reason staff adjusted their work to support the child. If a child had refused to take part (for example, if he was distressed because of the presence of the researcher or a camera), that lack of assent via refusal to take part in regular activities because of this change would have likely resulted in choosing a different child with similar characteristics to participate in the project instead. However, this did not occur. An alternative would have been to ask parents about "*signs and signals that will indicate that the child wishes to withdraw from the research*" (Shaw, Brady and Davy, 2011: p. 31), as the National Children's Bureau recommends when working with very young or severely learning disabled children (*ibid*.).

Because of the factors outlined above, the participation of children in the research was permitted or refused by parents. Before conducting any step of data collection, parents of the children had been fully informed of all aspects of the investigation, including the researcher and aims of the study, and had returned their signed consent form (see *Appendix 10*).

Another ethical concern is related to confidentiality and anonymity of the participants (Robson, 2002; Lankshear and Knobel, 2004; BERA, 2011). A small-scale study of this kind requires increased attention to confidentiality and anonymity, as a smaller sample of cases is easier to identify. To address this issue, participants' names were replaced with pseudonyms in the entire research. As there are only a small number of autism specialist schools in Saudi Arabia, some details about the research setting were omitted from the

final version of the thesis, to avoid making it easy to identify the school and therefore its staff and students.

A particular anonymity-related problem was related to the fact that video footage would be used for research purposes. The researcher obscured the faces of all staff members and children to ensure that neither the adults nor the children were recognisable. The two persons appointed to perform reliability checks of the footage were also informed of the necessity to sustain confidentiality.

Eventually, it was necessary to show the aspects of the study that were beneficial for the participants and the Autism Centre. The aim of the study, as well as the methodology, was closely related to their occupation. It was assumed that if a set of principles related to adults' interactive style was determined, it would ultimately have a broader use, thus benefitting all participants. According to BERA (2011) requirements, the researcher is obliged to work in his participants' best interest and restrain from increasing their workload. In this case, the researcher was able to do so by extending his visits at the school and visiting the school for five consecutive days in a week. The researcher invested maximum efforts into the discussions, providing advice from personal knowledge, experience or understanding.

The University's Code of Practice for Research requires preserving all data, making sure it can be accessed for ten years after the study has been completed. The researcher will be the only person able to access it, as is will be stored at his home in a locked container. After the ten-year period, the recordings will be destroyed and the documentation shredded.

3.18 Validity, reliability and inter-rater reliability in action research

Validity, reliability and reflexivity are key research criteria in planning and conducting action research. The following sections discuss the general background of each of these, to lay the groundwork for explaining how these were addressed in the design of this study.

In order to assess the validity of a study, the method needs to be examined with regard to its usefulness in measuring the dependent variable, most commonly achieved by implementing a pre-study pilot to ensure this (Wellington, 2000; Cohen *et al*., 2007; Robson, 2002). In the design stages, external, internal and ecological validity are recognised as extremely valuable, the latter two providing a challenge in field experiments (Yin, 2003). External validity is used to describe the generalisability and repeatability of the study, and internal validity describes the indication of causality between variables (Cohen *et al*., 2007; Bryman, 2008). To improve external validity, an in-depth explanation of the methods of data analysis can help those using the study as a base to decide whether the results are applicable or not (Burns, 2000). Internal validity can be harder to prove in naturalistic experiments, so that term is not often used by interpretivist researchers. Instead, they often make use of the terms *"generalisability"* (Robson, 2002), or in the case of Riege, *"credibility"* or *"transferability"* (2003). In this study, a pilot phase was used to identify and prevent problems in the actual research. This process, along with discussion with staff during the action research process, identified issues with video recording, researcher role, and variables regarding individual children that had to be addressed, or at least taken into account.

The final type of validity to consider is ecological validity, which, to paraphrase Bryman (*op cit.*), refers to the relevance of the study to day-to-day life, i.e. the practical applications of the findings. In this particular study, for example, the more faithful the

school setting remained to its usual running procedures during the study, the greater the ecological validity of the study. It is recognised that the results of this small study cannot make claims to be generalisable. It should be regarded as a case study of the use of AISI in a specific setting and culture and with a specific age group, and validity is not a key criteria in case study research (instead, Lincoln and Guba, 1985, suggest striving for *"trustworthiness."*) However, case studies can make a strong contribution towards education research by providing examples of good practice, and testing theories in real-world settings (Bassey, 1999).

Standardising the methodical processes and apparatus can also improve validity. Yin (2003) proposed that triangulation is an effective method to this end: using more than one source of data to investigate the same phenomenon. This was done in the present study.

Reliability, much like validity, can sometimes be elusive in field research. It can also be interpreted differently depending on the type of data being collected, whether this is qualitative or quantitative (Wellington, 2000; Cohen *et al*., 2007). While reliability is more a measure of consistency in the method and the level of repeatability in quantitative studies, in terms of qualitative data, reliability is comprised of consistency between data collected by the researcher and actual events, though *"dependability"* is often used instead of *"reliability"* in this case (Mertens, 1998; Robson, 2002).

In order to improve the validity of results, the implementation of inter-rater reliability testing is necessary. This involves the results being verified by at least two different individual raters, with similar theoretical background and academic credentials and experience, by observing behaviour and results congruently (Cohen *et al*., 2007). This method of inter-rater reliability is preferable in situations in which there is a high risk of

rater bias due to the lack of control over environmental variables that may unintentionally affect the behaviour of participants (Coolican, 2006). The level of agreement between raters, ideally, should be no lower than 80% to ensure reliable results, a standard devised by Reichow *et al*. in 2008. The percentage is usually calculated using a method in which the number of points of concurrence between raters is divided by the sum of all points (both agreements and disagreements), the result of which is then multiplied by 100. This method was proposed by Watkins and Pacheco in 2000, and is known as the 'percentage agreement':

$$\frac{Agreement}{Agreements + Disagreement} \times 100$$

As noted in *Section 3.12: Reliability checks*, inter-rater reliability was tested regarding the video recording data.

The reflexivity of a study is very much influenced by the researcher's experience, both in education and in terms of ideological standpoint, where reflexivity is taken to mean an acknowledgment of the aforementioned. Denscombe, writing in 2010, noted the difficulty in seeing things from the perspective of participants when the researcher's individual *"way of seeing things"* is the only available tool through which to experience events (p. 86), later noting that it is important that researchers disclose their ideological beliefs and worldview to the participants. As discussed in the preceding section, this was also crucial to gaining their trust and participation.

3.19 Summary

This chapter described the overarching aim of the research, which was evaluating the effectiveness of an AISI on autistic children's spontaneous communication in the context of a school in Saudi Arabia, with children aged 5-7 who come from an Arabic-speaking background. Additionally, it highlighted the research questions that this study aimed to resolve. The chapter examined the main philosophical and research theories that underpinned the study's design, and explained the reasons why this study worked within the pragmatic or mixed-methods paradigm. It described the action research approach with regards to its advantages, challenges and criticisms.

Moreover, it provided details of the research design of this study, and described the characteristics of the setting and the sample. An overview of the stages within the action research cycle as carried out for this inquiry, and the research methods employed, are discussed in detail, including the main data collection and coding methods and discussed key research terms such as validity, reliability and reflexivity in relation to this research. The choice of each of these methods discussed with reference to arguments in support of their use in this research and the overall administration process. The concluding sections described the ethical concerns that arose in the course of preparing the study and how these have been addressed.

The following three chapters provide the research results. Because the focus of this research is on changes to staff behaviour, data on staff is presented first, followed by data related to the children. In *Chapter 4*, the presentation of data collected during the research will begin with findings from pre- and post-intervention interviews with staff. *Chapter 5* presents data on staff implementation of AISI principles, and *Chapter 6* presents the data on initiation of communication by the children.

CHAPTER 4: QUALITATIVE RESULTS

This chapter presents results obtained during the pre- and post-intervention phases of this research. Qualitative data was derived from semi-structured interviews with the teachers participating in the research, and thematically analysed. Additional data was derived from field notes taken during the observation of teachers and discussions with them. Where relevant, links are made between data sets. The purpose of conducting baseline interviews with five teachers of autistic children at the Autism Centre was to find out about their openness and flexibility in regards to adopting AISI, in order to address research question 4: *to what extent are adults able to change their interactive style?*

4.1 Interview procedure

The researcher conducted semi-structured, one-to-one interviews with each of the five teaching staff members before the AISI intervention. The interview schedule was comprised of 32 questions in seven categories: *Knowledge and understanding, Training, Attitudes, Practice, Changes/developments, Barriers and needs,* and *Attitudes to changing practice*. Following the intervention, each staff member was interviewed again regarding their experience of using the AISI, their impressions of its effectiveness, and barriers to implementation. The interview schedules used for both sets of interviews can be found in *Appendix 6*.

Each interview lasted between 45 and 60 minutes, and was conducted in a quiet room at the Autism Centre. Interviews were then transcribed using a regular word processing programme. Each interview was transcribed using the exact words of the participants. For

these interviews, transcription was followed by translation: interviews were in Arabic and the researcher translated the transcripts of these into English, to make it easier to conduct analysis for a thesis written in English. Translation was then reviewed by an external agent for approval.

4.2 Interview analysis

As noted *in Chapter 3: Methodology*, this project, thematic analysis was used to identify key themes in the qualitative data, and to eventually explore the dynamics within each theme. This analysis was conducted manually rather than with specialist software, due to the small size of the sample.

4.3 Observation of practice (field notes)

Extensive field notes were taken during the observation process. Where relevant to the data derived from interviews presented in this chapter, the results of these observations are related to material gained from the interviews. Some data from field notes is also presented in *Chapter 5: Staff Results*.

This chapter will present findings from thematic analysis of the qualitative data collected. Firstly, baseline information from pre-intervention interview will be presented, regarding the staff participants, including their backgrounds, their attitudes towards participating in the study, and their general orientation towards working with autistic children. The Autism Centre, its main objectives and its atmosphere are described. The unique position of an autism specialist school in Saudi Arabia is also explored through describing the Autism Centre and its teachers' main approaches to autism and working with autistic children.

Secondly, teachers' impressions of the efficacy of the AISI intervention and details about its use will be described. This qualitative data is derived from post-intervention interviews with staff. This section ends with a discussion of key themes that emerged from participants' post-intervention interviews, and relates them to the video footage of staff members working with children with autism.

Thirdly, significant findings will be summarised and related back to the literature review (see *Chapter 2*). This final section presents a discussion of the combined pre-interview and post-interview findings. This will provide an overall evaluation of the successes, failures and lessons to be learnt from the implementation of the AISI at the Autism Centre.

The conclusion addresses insights that emerged from the qualitative data overall, which include: (1) the importance of evidence-based research; (2) the need for teachers to see new strategies working with their own eyes to encourage them to act on evidence; and (3) the importance of taking into account teachers' experience. These insights will be used to explain why some teachers were more effective in implementing AISI principles.

Findings which are deemed to be significant are presented. 'Significance' is defined for the purpose of this case study as opinions that are expressed by all or most of the respondents. Because of the small size of the sample (five members of staff), a quantitative analysis of the interview results would not have been valid in terms of mathematical significance. In addition to reflecting results that are common regarding the staff group, the individual opinions of certain respondents will sometimes be presented in this chapter if these comments are considered especially relevant to this research or to other information that has been attained with regards to that particular staff member.

Additional research findings are presented in *Chapter 6*, which describes data obtained about the children's communication during the intervention phase of the research, and *Chapter 5*, which provides results about staff behaviour obtained from the video data. These chapters include both qualitative and quantitative data derived from the analysis of video recordings of staff using AISI with the children, and explain how the staff's interactive styles and frequency of using AISI principles were analysed and how these impacted the children's spontaneous communication.

4.4 Pre-intervention qualitative findings

Teachers differ depending on their knowledge, experience, approach, cultural background, and the organisational culture in which they work. These factors may influence teachers' effectiveness in implementing AISI.

In order to explore changes in the teachers' interactive style, staff were asked: if they believed that adults can influence the communication abilities of children with autism; what kind of specialist support would help the staff to enhance the communication methods used with the children; what practices they used to interact with the children at the time of the research; and what barriers to interactive communication they have faced. Their answers to these questions made it possible to document and understand existing practices, attitudes, resources and barriers in this specialist Autism Centre before the implementation of AISI. In addition, the baseline interviews explored the teachers' openness to adopting new ideas and adjusting their interactive style. This task required asking the staff if they are satisfied with their current method of communication, and whether they would be interested in adopting new methods for encouraging children to initiate interactions, or in adjusting their current style of communication.

In the literature review for this study, a number of themes emerged from research regarding factors that are likely to impact teachers' practices and willingness to adopt new methods. These factors were the target of questions asked during the pre-intervention stage, to assist with exploring staff members' ability to change practice, and are summarised below.

Dominant approach practised: This refers to the dominant approach used by each individual teacher to communicate with children with autism in their school. This approach is evidenced in the communication techniques employed by the teachers.

Knowledge: This refers to teachers' level of knowledge concerning the children that they were teaching at the time of the study. This includes: child characteristics, communication methods and communication ability.

Training: This refers to training undertaken by teachers before and during the time they have worked with autistic children, and includes any specialist support given to the teachers. This theme also takes account of the effect of training on practice. Training discussed includes: (1) pre-service training in regards to methods of communication;(2) specialist support available to enhance teaching/communication methods; and (3) further training needs regarding new or different methods of communicating.

Attitudes to changing practice: This refers to teachers' openness to making adjustments to their regular practice or interactive style. It includes how teachers generally feel about students with autism in their classes, teachers' perceptions of their ability to make a change, and their motivations to work with children with autism.

Changes/development needed: This refers to teachers' ideas about what improvements need to be made with regard to the facilities for SEN children at the school. This also includes the teachers' perceptions of the kind of training they need in order to improve their practice.

Barriers: This refers to potential barriers to acceptance and implementation of the AISI intervention. This includes cultural barriers in terms of set ideas about best practice, as well as administrative barriers at management level.

These themes will be addressed in subsequent sections of the chapter, with reference to data from the pre-intervention interviews.

Of course, it is recognised that respondents often expressed their thoughts in different styles or used different vocabulary. Nonetheless it was possible to review all of the pre-intervention findings and to categorise the significant pre-intervention findings according to four main subject headings. Where appropriate, sub-headings are used to highlight key findings. Thereafter, significant findings will be summarised and discussed.

4.4.1 Dominant approach practised

Just as autistic children should be regarded as unique individuals with different abilities and different needs, teachers also are likely to differ depending on their knowledge, experience, approach, cultural background, and the organisational culture in which they work. These factors may influence the effectiveness of implementing the AISI intervention. Therefore, in order to guide the teachers' approaches towards the child with autism, the dominant approach they followed during the pre-intervention period must be considered in order to adapt ways of implementing AISI principles effectively. By

highlighting aspects of current practice that were congruent with AISI principles, they could feel more comfortable about any changes, seeing these are building on existing practice.

4.4.1.1 Pre-intervention practices based on behavioural approaches

When the teachers were asked about the dominant approach they practised at the centre, all five of them mentioned PECS, TEACCH, ABA or EIBI, and some mentioned elements of the Son-Rise approach as something they theoretically might use. However, during the course of the interviews, it became apparent that only certain aspects of PECS, TEACCH, ABA/EIBI were actually being implemented pre-intervention; no elements specific to Son-Rise were in practical use (other than elements it has in common with other approaches). In particular, with regards to the teachers' use of principles that could assist in initiating spontaneous communication from the children, it was found that these consisted almost entirely of non-verbal prompts, minimal speech, offering choices, and showing availability. Two of the five teachers also mentioned waiting for initiations.

Teachers' discussions of why these pre-intervention practices were used referenced primarily behavioural criteria for these approaches, although the developmental interventions examined in the literature review also advocate using similar approaches, for different reasons. Although all teachers stated that they have been trained in PECS, TEACCH, ABA/EIBI, and Son-Rise, there was limited awareness regarding exactly how adjustments made by the adult regarding communication style or the environment might facilitate spontaneous communication. Their comments indicated that while they have familiarity with adult-*directed* practices, their understanding of adult-*focused* practices (where the onus is upon the adult to amend their behaviour in order to effectively encourage spontaneous communication from the child) is lacking, and could be difficult to

foster, because the culture of the school was influenced by behavioural approaches. For example, the staff would be likely to intervene too soon, and to use excessive speech which the child might not recognise, because the stated goal of adult behaviour in adult-directed practices is to gain compliance from children and encourage them to carry out specific tasks. In a typical ABA discrete trial, adults are encouraged to praise successful task completion and then move on quickly to either further repetition or the next step. Accordingly, instead of describing these customary practices in terms of the impact of their own behaviour, the teachers tended to express success in terms of the child's reaction. Their responses lacked detailed reflection on amending the role of the adult in order to facilitate communicative initiation.

On the other hand, with regards to using exaggerated pitch and dramatic facial expressions, three of the teachers did say that they regarded this as a good way of interacting with the children. These approaches are advocated by many EIBI practitioners, for example, to gain and maintain children's attention. However, the primary goal of gaining that attention is compliance with task completion rather than encouraging children to spontaneously communicate.

In general, the teachers reported that they believed they can best influence the communication abilities of children with autism by using visual and non-verbal communication (e.g. images, body language, gestures and signs), as they had learned in training that autistic children are highly visual thinkers. Typical statements included:

> *"The best way to deal with the non-verbal child through our work is visual cues and sign as it also includes body language. The autistic child is a visual person and the best way to deal with him is communicating with pictures."* (Yousef)

> *"Try to make a positive relationship between the student and the teacher through gestures and signs."* (Wedyan)

> *"Some experienced teachers dealing with children have the biggest effect on them through PECS, and communication boards."* (Alahadal)

However, although the use of non-verbal cues represented one of the main elements in the teachers' pre-intervention practices, it was mentioned by all staff members that a heavy reliance upon signs could lead to potential difficulties, For example:

> *"Children can pick up words that are linked to signs but, just like words that are spoken, after they've been used they are forgotten."* (Wedyan)

This teacher has picked up on the fact that learning to understand and use signs can represent nearly as many challenges for a child with autism as learning to understand and use spoken language. For some children, the challenge may be symbolic communication, for others it may also involve short- or long-term memory of symbolic vocabulary (spoken or visual). This is something that has been discussed in the literature, in particular in relation to Makaton, which uses a large vocabulary of signs and symbols to help people communicate. Also, Makaton is designed to support spoken language, and the signs and symbols are used with speech. To minimise confusion, adults should use as many visual cues as possible, supported by minimal speech, until they are certain that the symbolic communication system being used is working well for the child. Rather than avoiding the use of signs and symbols because they could be difficult, the approach needs to be tailored to the abilities and preferences of the individual child. Staff beliefs about these practices provided an example of challenges they faced in the workplace: they took the training they received very seriously, and sometimes a bit too literally. They also found it difficult to deviate from established practice in the centre, both because they felt unsure about

challenging receiving wisdom, and because the centre's administration told them to carry out children's remedial plans (IEPs) as instructed.

Despite the reservations expressed above, non-verbal cues were considered effective and were widely adopted by all five teachers. The same also applies to the use of minimal speech by all of the teachers:

> *"It is an easy concept to practice… It was part of my induction and I've been using it ever since."* (Yousef)

> *"I really do make an effort and I hope I've got better and I don't talk too much."* (Alahadal)

On the other hand, it was further stated that:

> *"Not everybody's idea of minimising speech is minimal in practice even though they might think it is."* (Haskoor)

This appears to suggest that teachers may not actually be using minimal levels of speech in ways that most effectively encourage spontaneous communication by the children. Although the teachers regarded minimal speech as being straightforward to understand, as a potential tool for facilitating spontaneous communication, its practical application may need clarification and further training. This pre-intervention finding indicated that minimal speech should be clearly explained to the teachers, in order to ensure that they are truly using a level of speech that the child can understand (e.g., with some children this might be limited to one or two relevant concrete words). The fact that some of the staff had differing

definitions of ‘minimal speech’ might reflect insufficient illustration during their training of how to implement this strategy.

In addition, all of the teachers also said that they regularly offered choices to the children as another way of attempting to facilitate spontaneous communication from them. All of the teachers said they offered choices a few times each day, and that they found it very effective.

Three of the teachers also explained that they usually showed availability to the children:

> *“By keeping my hand in sight but taking it away... [shows] I am available.”* (Olfat)

> *“I like using hand signaling and it’s useful to leave my hand in close range and then wait until they take hold of it.”* (Alahadal)

On the other hand, whilst non-verbal prompts, minimal speech, offering choices, and showing availability as ways of expanding communication were regularly practised by all five teachers, only two of the five teachers mentioned their regular application of waiting for initiations. The difficulty most commonly associated with this principle was uncertainty over the period of time that the teacher should wait for the child to initiate communication. Olfat, who is one of the three teachers who rarely practices this principle, stated:

> *“I am not sure if I am good at waiting… I think I’m often too keen to communicate myself.”* (Olfat)

When the teachers were informed (or reminded) of practices they were not implementing, a variety of reasons for not using them were given. For example, with respect to responding to the child's communicative attempts, it was said:

> *"I don't just do as they ask… I am the teacher with authority for telling them*." (Wedyan).

Such comments indicate that the practice of adult-led, rather than adult-focused, practices predominate.

Furthermore, when asked about imitating the child, three of the teachers stated that they do not use this principle. The various reasons that were given to explain its non-usage were based upon it increasing negative behaviour, which in turn would cause the management team and/or the child's family to then blame the teachers. Also, although Haskoor and Olfat accepted that imitation could actually lead to improvements in spontaneous communication, its non-use might be associated with the Saudi cultural attitude of feeling shame within certain situations. As Yousef said:

> *"It isn't difficult… it's too embarrassing, especially if someone was to watch me or see me."* (Yousef)

In Saudi culture, interactions between adults in authority, such as teachers, and children are somewhat proscribed. Teachers are expected to behave in a dignified manner, providing a good role model for children to pattern their behaviour on.

While maintaining dignity and authority may be a rationale for some avoidance of imitation, some of the participants also said imitation may encourage negative behaviours. This is an area of practice where teachers may feel constrained by the behaviourist orientation of their training as well as concerns about management opinions or shame about looking silly in the workplace. Similarly, when mirroring the child was described to the teachers and they were asked if they used this approach, most of the teachers expressed feeling awkward or uncomfortable with such principles, and so finding it difficult to practise them. When the researcher asked additional questions, and probed deeper in an attempt to understand this reluctance, the teachers' responses were generally vague, with the excuses of feeling awkward or uncomfortable repeated.

4.4.1.2 Existing practices have achieved some improvements in the children's abilities to initiate communication

Since the children arrived at the centre and started receiving the services in their remedial plan, four of the teachers had seen students with autism develop the ability to initiate communication with their teachers. Haskoor and Alahadal had seen children learn this skill, apply it to other situations, and then move on to other phases of communication using the PECS system. Yousef and Wedyan stated that this progress takes time to develop *"due to the nature of autistic child"* and that it cannot develop overnight. However, they were satisfied with their children's progress. In addition, Olfat stated that she had seen children learn to recognise their teacher and form an attachment, as her children now initiated communication by coming to her, touching her hand, or saying hello.

The teachers indicated that children with autism are most likely to initiate communication with the teacher in natural situations: for example, when they need to use the toilet. The

teachers described three main activities or circumstances when children with autism were most likely to commence interaction with their teacher. These were: when asking for food and drink when they see it, during the breakfast activity; when asking for help and assistance, or for something specific; and when asking to start some rewarding activities, such as play activities. The teachers said that over time, and with experience, they have learned how to attract and maintain the child's attention by following the child's lead and then providing a commentary on what the child is doing. Through this activity, staff showed the children that they are interested in communicating with them. For example, if a child indicated that they want to play with a specific toy, this request can be met by the adult but communication can then continue during the activity.

Although the teachers noted that PECS has often been involved when children's spontaneous communication increased at school, they also stated that some families prefer them not to use PECS with the child. These parents think that if the staff keep using PECS with their child, it might be an obstacle to developing spoken language. As Wedyan stated:

> *"My child, who was involved in the study, has limited communication and few words but he has hyper-attention. He made quite a lot of progress, but his families required me not to use PECS with him as they want to improve the ability of his speech."*

So even when staff find techniques that are effective, they can face barriers to using them.

When discussing the development of communication skills in the children they work with, three out of five staff stressed that each autistic child is different. Some noted that autistic

children can lose the skills they have acquired, and that dealing with their communication can be difficult:

> *"Each student has specific traits that make them different from the others. In addition, the unstable skills of the autistic child mean that they may lose skills already acquired."* (Wedyan)

> *"I find working with autistic children particularly [challenging in regard to] communication because each case is different from the next. Each year I deal with different children, sometimes the same children, but sometimes I find it difficult in dealing and interacting with the children."* (Olfat)

Despite understanding that each child is unique and therefore may require different techniques to work on communication or even just to engage in interaction, the Autism Centre staff reported using only a few strategies – albeit with reference to varied models. This may be further evidence of over-reliance on behavioural strategies, and a fairly short list of these. The literature indicates that while behavioural strategies may be easier for teachers, administrators and parents, in terms of setting tangible goals and being able to quantify and assess efficacy, they can lack flexibility in terms of adapting to the child's abilities and needs (Dillenburger, McKerr and Jordan, 2014). The limited set of approaches available to staff at the Autism Centre appeared, based on statements made by staff, unlikely to be appropriate for all of the diverse needs and learning preferences of autistic children.

4.4.2 Knowledge and training

Respondents had good levels of practical experience and academic achievements relevant to SEN. Findings from the pre-intervention interviews indicated that teachers' experience of working with children with autism varied from four to eight years; most of the teachers had previous experience working with children with learning disabilities and/or autism, and all teachers held university qualifications in Special Education Needs (SEN). In the Autism Centre, all staff had worked with one or more children with a diagnosis of severe to moderate autism. Often this work was very focused and 1:1, giving staff many opportunities to get to know the children as individuals. As most staff had been in post for some years, they had each worked with a number of autistic children as the student group changed.

When asked about factors contributing to effective teaching, teachers focused first on personal qualities. The most important personal quality cited for working effectively with autistic children was flexibility, then patience, followed by firmness. By firmness, the teachers meant that the teacher has to respond to the child firmly, e.g. *"you have to complete the work, then play,"* by giving a firm order.

Staff also highlighted key skills needed for effective teaching. They discussed three categories of teaching skills: (1) knowledge of autism, (2) basic skills and (3) flexibility. These points are supported by Wittemeyer *et al*. (2015) regarding parents' views of staff skills required for working with children on the autism spectrum. This report highlighted the need for patience, flexibility, a sense of humour, empathy, developing the pupil's strengths, and being creative. However, only two of the five staff members stressed the importance of flexibility when dealing with children with autism. This may reflect the

influence of adult-directed rather than child-directed approaches, as well as the authoritarian school culture of Saudi Arabia.

The category of 'knowledge' was described by participants as having knowledge and full awareness about autism, including characteristics of autism generally, and awareness of how each child's autism presents. The need for adequate general and specific knowledge was mentioned by all participants. Two participants added that it is important to keep up with new developments in the field of autism.

When asked what basic skills they felt teachers needed to work with autistic children, participants described a variety of educational practices and approaches. All participants emphasised the importance of communication skills. Three participants stressed the importance of skill in using specific methods, such as ABA, PECS or communication boards, and TEACCH. Two participants mentioned the importance of the ability to write the remedial plan (individual education plan) for each student; and one participant mentioned good behaviour modification skills.

Data from the pre-intervention interviews was checked against the researcher's own pre-intervention observations and fieldwork-notes regarding actual classroom practice. The researcher saw direct evidence substantiating the teachers' claim that they had good knowledge and understanding of the main/classic characteristics of autism at the pre-intervention stage. Staff at the Autism Centre kept up with current knowledge by either in-centre workshops or external training from specialist trainers, as evidenced by records and discussion of training, practice and supervision. However, knowledge acquisition was narrowly focused on a few interventions, namely TEACCH, EIBI/ABA and PECS. A

much smaller amount of training, practice and supervision was focused on adult-based practice.

It was clear from both observations and pre-intervention interviews that the teachers lacked more understanding of adult-based practices, even though they employed some principles of these. Classroom activities with children were designed using principles derived from the ABA/EIBI, PECS and TEACCH approaches. When asked about their work with children pre-intervention, teachers discussed their approach to tasks in terms of their practice, such as discrete task trials and chaining. Nor did they have much specific knowledge of AISI principles, even though they seemed to be aware of quite a few principles (e.g. minimal speech, expanding on communications, and responding to the child) learned from their training in other interventions, and incorporate some of these into their daily work.

4.4.2.1 Teachers' past training and desire for additional training

The basic skills mentioned by participants, other than flexibility, relate to training prior to working with autistic children, as well as ongoing training and supervision. All had received at least some training in ABA/EIBI, TEACCH, PECS and Son-Rise. All of the teachers wanted to know more about what specific and best training and intervention methods were available, and they also wanted to have more in-depth knowledge, training and advice on fostering spontaneous communication. As Haskoor stated:

> *"Everybody still has imperfect or limited knowledge and experience, so they need some more practice or new skills to deal with children."*

For any specialist teacher working in the Autism Centres in Saudi Arabia, training is typically undertaken at several points in the teachers' career path. Firstly, pre-work training is provided by a university, during which the teachers are introduced to the history, aetiology and developmental course of autism, as well as to teaching methods and approaches for working with children on the autism spectrum. The second point of training occurs when a teacher enters a specific Autism Centre, and receives training in the specific methods used in the centre. Following entrance into a centre, teachers receive ongoing training through supervision, seminars and workshops, at the discretion of the centre and in accordance with the government requirements. For example, at the Autism Centre where this research was carried out, staff worked for six months under supervision and took supplemental courses in PECS, ABA and TEACCH during this intensive training period. The teachers said they had benefited greatly from pre- and in-service training at the centre, including upskilling during pre-work training, and said that as a result, they felt more competent in their teaching and communication with the children.

The staff were slightly aware of some other recognised approaches, such as Intensive Interaction and DIR/Floor Time. One of the strengths of the Adult Interactive Style Intervention is that it is based on a selection of principles derived from several current interventions. While they were not familiar with AISI as a specific intervention and so did not label adult adjustments such as using minimal speech as AISI principles, they did employ some of the AISI principles, having derived them from other interventions. For other principles, they lacked knowledge or had only theoretical knowledge as opposed to experience of implementation. For these principles, staff stated that they did not feel confident applying some of these principles, as they are more familiar with the principles

they normally used, which were based on focusing to change the child's behaviour rather than adjusting adult behaviour.

The teachers mentioned that there is a variety of specialist support available to enhance their teaching/communication methods. This encompasses visits to and from experts/specialists in autism, including doctors from different countries such as the USA, Egypt and Jordan, and also visits from researchers in autism. In the current sample, the extent and scope of pre-work training differed among teachers. Teachers received training in the theory and practice of working with students with autism for a period ranging from two months to two years.

When the teachers start working at the centre, they undergo training in methods of communication. The teachers mentioned completing pre-service training in the Autism Centre. This included direct observation of teachers in the classroom in the Autism Centre (for a whole term, which is around three months), which involved experienced colleagues observing new teachers and then discussing with them how to deal with the students and how best to use PECS. They also have intensive training about PECS, follow-up courses on ABA, a course on Son-Rise, and training in TEACCH (including completing an intensive course, and three follow-up courses). This pre-service training covers all the necessary knowledge and methods of communication that are typically used to teach children with autism in Saudi Arabia. In general, the teachers reported high satisfaction with the quality of in-service training provided at their Centre. As Weyden said:

> *"This centre is considered the best one for developing the performance of the staff and employees."*

In addition, specialist support is available to the teachers in the centre, from Saudi Arabia, Egypt, Jordan, and the USA. This includes support in using PECS and ABA, behaviour modification lectures, discussing particular cases, and more. For example, Alhadal mentioned *"workshops and courses that tackle methods of teaching and other issues"*; a week-long training course where teachers can *"avail* [themselves of] *the experiences of specialists in the field of teaching methods"* was mentioned by Olfat; and other staff noted they had support from internal Saudi trainers. The teachers stated that these specialists include Dr. Andy Bondy (PECS expert), Dr. Michelle Beggis (speech therapist), Dr. Gary Mesibov (TEACCH training), Dr. Theo Peeters (training in educational and professional programmes) and Dr. Susan Ainsleight (training in Applied Behaviour Analysis), as well as the teachers' regular trainer from Jordan, Dr. Ahemd Aldawaidah, who trains staff to use the ABA approach.

All five teachers stated that they needed further training in new or different methods to support communication. They wanted to know more about all approaches used to interact with children, and especially those tested with children in developed countries. In particular, they said that they would like the training to be run from the USA or the UK. By this, they mean they would like to have the opportunity to come to the USA or the UK, to see how the practitioners and teachers in these countries interact with children using the latest strategies and most useful intervention. Both Alahadal and Olfat mentioned that their training needed updating: Alahadal said they wanted to *"learn more about the new approaches, and would like to visit developed places outside the Kingdom to know the modern teaching methods,"* whilst Olfat hoped for different experiences *"in the means of communication and interaction with autistic children."* It is interesting that the staff wanted to improve their practices and adjust their current style, but held a common

stereotype that developments would come from outside experts who would come to tell them exactly what to do. This may reflect insecurity about developing approaches based on their own experiences, management expectations, the authoritarian culture within Saudi education generally, cultural insecurity, or the fact that autism as a concept and autism interventions were initially developed in the US and UK. US, UK and European researchers and practitions have been influential worldwide, including being instrumental in writing the diagnostic criteria for the *DSM*, creating the diagnostic instruments most commonly used (such as the CARS and DISCO), and traveling abroad to present their findings and train staff. It is easy to understand therefore that staff in Saudi Arabia would look to the US, UK and Europe for advice and instruction about working with autistic children. Accordingly, the findings indicate that at the pre-intervention stage teachers believed that there were different and better approaches being used in the US and UK, and that recent research could give them some indications on how to interact with the child more productively and increase the child's engagement. For example, Wedyan stated that "*all of the employees at the Autism Centre required training in how to communicate with the autistic child*", which she found difficult, in order to increase their engagement with the children.

In summary, all teachers in this study felt that they needed further training, because they wanted to learn new techniques and more flexible intervention, and needed some advice about their interactive style to facilitate spontaneous communication with the children. The intervention phase of this research (see *Chapter 5; Intervention Results*) addressed this during the subsequent training intervention in AISI principles.

In conclusion, it seems that while the Autism Centre staff are confident about their ability to use approaches such as ABA, PECS, TEACCH, EIBI and Son-Rise when working with

autistic children, those employees participating in this research stressed unfulfilled professional needs. When comparing this feeling to the extensive support provided to the teachers by the centre, one may assume that this need pertains not to specific skills in implementing a programme, but rather a broader understanding of autism and additional ways of working. The researcher concluded that Adult Interactive Style Intervention could meet some of these needs, and would be accepted by staff members based on their expressed desire to learn more.

4.4.2.2 Teachers expressed their preference to learn from evidence-based practices

All participants were unanimous in their desire to learn from specialists in the field of autism, including visiting experts from Saudi and abroad. The participants expressed a preference for learning from evidence-based research. This preference carries within it an assumption that evidence can be collected that applies to all or most autistic children, which staff can then use to design effective programmes. However, as the literature review for this research revealed, evidence collected about a heterogeneous population is often contested, and flexibility of approach based on the needs and preferences of the individual child is more likely to be effective than dogmatic application of directional strategies.

However, their current learning and practices are based upon directional strategies rather than upon self-reflective or collaborative strategies. In other words, they seemed most comfortable with being instructed as to what to do, and they did not appear experienced or comfortable in collaborating with others and reflecting deeply on their own leaning processes. For example, Olfat said:

> *"I think we should learn from some experts and researchers; that will make some difference. If the expert or researcher provides some evidence and research results that can make a huge difference and improve our quality of interactive style."*

Yousef stated that one of the barriers to making positive changes and developments was ignoring evidence-based research. *"I believe that new research holds new techniques to facilitate child communication,"* he said.

Haskoor expressed very positive views about research and the scientific approach to gaining new knowledge in the field of autism:

> *"Science is in progress. Research findings encourage the learning of new methods which help provide the best care available. Measuring improvement in performance is difficult and only time will tell if this has been achieved."*

Wedyan also mentioned that *"the result of the new methods and also the evidence-based practice"* would convince her to try a new style or methods for helping children initiate communication and change her own interactive style. She said she would be convinced *"through presenting experiences and findings of others on how well the method was successful, particularly if the training was practical, either by video or direct observation."*

The participants frequently mentioned that they need *"evidence"* (over theory) to convince them that any new method does actually work, that is, they needed to see it working with their own eyes before they would be willing to try it. For example, Haskoor stated:

> *"It is evidence, that means when some method being used with the child provides benefits for the child.* [If I see evidence] *I will continue to use it."*

Wedyan also supported this comment, stating:

> *"Also if we see improvement in the child, that is the reward for changing style, and to be honest with you we need some methods to be changed, for example, to expand the speech and intervene quickly with the child–they don't wait even for a second sometimes, which makes the child dependent and does not give them opportunities to communicate."*

Haskoor also acknowledged that it is only realistic to expect experienced teachers to adopt completely new ways of communicating with their students *"provided that it is based on scientific evidence and under specialised supervision. If we see that it is useful, we will use it."*

Experience was mentioned several times as being important, for example, the difficulty and frustration of working with non-verbal autistic children was said to ease with experience, and experienced teachers were seen to have a more positive effect on autistic children:

> *"At the beginning of my experience it was difficult when I was exposed to aggression. Children had aggression to some extent, and then I got some experience in dealing with them."* (Alahadal)

> *"Some experienced teachers dealing with children have the biggest effect on them through PECS, and communication boards."* (Alahadal)

Experience was also cited as one of the personal qualities that teachers needed in order to work effectively with autistic children, as Haskoor said:

> *"From my point of view, experience plays the main role. In sympathy with Arab cultures there must be respect for the Head of the Family and respect for seniority. Most of the Saudi caregivers valued experience – it plays the main role. With the passing of time and through experience the quality of the relationship between pupil and teacher improves and we learn which means of communication suits which child."*

Participants also mentioned gaining experience through exchange visits, from foreign specialists in the autistic field, looking for experts in different interventions, and learning about the experiences of colleagues from developed countries in terms of the methods they use to communicate with autistic children, for example, Olfat said:

> *"Yes, sure, in particular we hope to find out about the experiences of developed countries in the means of communication and interaction with autistic children, to help the child to better their quality of life."*

To the extent of the additional insights presented in this last section, it seems that one of the main areas of concern is professional versatility and the ability to communicate with and learn from other teams.

4.4.3 Attitudes

Although most of the teachers expressed some positive feelings about teaching children with autism, most of them also expressed many negative feelings. For instance, Haskoor appeared to be feeling the pressure of being the most expert/senior teacher that other teachers look to for training and support, and who designs the curriculum. But when the results of his efforts produced better-quality communication in the children, he felt very positive. He said that the work is therefore difficult, but can be very rewarding.

Positive feelings were experienced by the teachers when case progress was good, for instance: when the student communicated better; and when there was enough parental support, which means moral support and validation for the teacher. However, Alahadal, the least experienced teacher, only felt frustration when working with children with autism:

> *"Recently, I always feel frustrated because I started losing focus in dealing with children because work often just feels like a routine."* (Alahadal)

> *"Confused feelings, frustration, fun, depending on the case progress."* (Olfat)

> *"Sometimes I feel pressure in terms of working with the child and designing the educational plan, as well as training the new trainees. And sometimes I feel very positive when my students communicate better and do what I expect from them."* (Haskoor)

> *"I feel optimistic about the reaction of the parents and about them giving me the trust and motivation to a great extent. On the other hand, I feel frustrated sometimes as I want new techniques to improve the quality of communication."* (Wedyan)

Such comments suggest that high levels of pressure, frustration and difficulty were regularly felt by staff during the pre-intervention period. Although some progress in facilitating spontaneous communication had been achieved, often the teachers stated that the children's progress could still be much improved. However, it should be noted that the teachers, as per the medical model, tended to evaluate progress in terms of the children's behaviour. Therefore, the researcher anticipated that the teachers' negative feelings could be reversed towards positive feelings after the AISI principles are introduced. This is because it would change their perceptions by regarding progress in terms of developing the role of the adults towards effectively encouraging spontaneous communication from the children.

When asked what their greatest difficulty was in working with children with autism, two identified the children's limited communication, two identified the children's lack of attention and one identified the children's aggression levels. The most difficult period was when the teachers first started working with the autistic children, but for some teachers, the experience has changed their lives. For example:

> *"In my opinion one of the most difficult jobs in the field of Special Education is to work with autistic children."* (Haskoor)

> *"At the beginning of my experience it was difficult when I was exposed to aggression. Children had aggression to some extent, and then I got some experience in dealing with them… but dealing with autistic children can be difficult. I followed a routine life since I began working at the centre 8 years ago – where I deal with non-verbal children, except for one year when I taught a child who could talk – It was a nice year."* (Haskoor)

> *"I find working with autistic children particularly [challenging in relation to] communication because each case is different from the next. Each year I deal with different children, sometimes the same children, but sometimes I find it difficult dealing and interacting with the children."* (Olfat)

> *"In the beginning I found it difficult, but my personal experience has given me a perspective which differs a little bit from the majority, due to having a brother with a severe disability. This encouraged me to work with and serve children with autism."* (Yousef)

Haskoor mentioned that it can be difficult to track the autistic children's progress, as it takes time to see changes in performance.

Furthermore, Haskoor and Yousef were both attracted to the field of autism by the salary and rewards of the job. Four of the teachers were also attracted by the 'challenge' of working with autistic children. They mentioned enjoying the big challenge of exploring new things, seeing the child communicate better, and the children's need for teachers *to "improve their quality of life"* (Olfat). Helping the parents was another strong motivating factor, as well as personal and professional development provided by the centre:

> *"Salary is the effective aspect, and the feeling that dealing with autistic children is at times satisfying. Also, facing the challenge within yourself, since doing anything with autistic child is a great thing."* (Yousef)

> *"Helping the parents. The location, since the centre attempts to develop its staff through training, and this is the most motivating factor for me for development."* (Wedyan)

Wedyan also mentioned hoping that new training can help improve staff performance and morale. She stated that her difficulties at work would be eased through further training, and she felt frustrated as she wants to learn some more new techniques to improve her communication with her students:

> *"Yes, since science and knowledge do not stop, I need training in terms of how to deal with the autistic child. There is a difficulty in this aspect, and I believe that all employees need training. I feel frustrated sometimes as I want a new technique to improve the quality of communication."* (Wedyan)

4.4.4 Changes/developments needed and barriers/solutions

In the following section, staff beliefs and experiences regarding workplace and staff development and potential solutions to problems are discussed.

4.4.4.1 Facility improvements and barriers identified

There were improvements in facilities that the teachers would like to see provided for children with autism in their school, and which some teachers had but have since lost due to building renovations. These include a big game hall, sensory room, an external environment that contains some plants and animals (for learning in the environment), and more modern technology (video modeling, training based on video, etc.)

Administrative and financial barriers exist, because approval is needed from higher authorities, and sometimes there is a lack of financial resources. This was mentioned by three teachers. For example:

> *"There may be some restriction from the centre management, but if they see some advantages they will help us to keep going and continuing*." (Wedyan)

> *"[There is] the need for approval by higher authorities, which is the management team at the centre."* (Alahadal)

Also, material barriers may exist due to the lack of resources and support, the teachers needing more material, and more support required with regards to knowledge and ideas. They are looking for new materials and something to help the child to communicate more. Such barriers were mentioned by two teachers, such as:

> *"There are material barriers relating to resources, such as a need for some physiotherapy and some materials to help the students (multi integration sensory room). We also need some more material and some more support with knowledge and ideas sometimes, for example, some practical ideas to help the students."* (Olfat)

On the other hand, cultural barriers can include the non-acceptance of new ideas that are not backed by large amounts of research evidence, and the lack of awareness about autism within families. These barriers stem from the non-acceptance of new ideas unless supported with reference to research, and a situation where some families are scared to put their child in an experiment. Therefore, there is a lack of awareness about autism (particularly by the families) as described by two teachers.

Finally, some teaching style barriers were identified from researcher observation and fieldwork notes pre-intervention. These include making the child dependent (e.g. helping

too much, intervening too soon), and using excessive speech that the child cannot recognise or process. Teachers were not always aware that they did these things, showing the value of observing practice as well as conducting interviews. The teachers acknowledged in interviews that these actions can create barriers, making the child dependent as the adult does not give the child chance to try. The researcher concluded from this evidence that AISI could address these issues by supporting staff to change and enhance their interactive style.

Although administrative and financial barriers were mentioned by three teachers, and material barriers by two teachers (referring to the lack of resources and support), from the researcher's observation, in terms of materials, the researcher saw all the materials that they need in the Autism Centre. The classrooms are structured, well-organised, modern and easily manageable for teaching. The centre used to provide more material resources (e.g. sensory room); they stopped providing this as the sensory room was not working, and it was in the process of being reconstructed (as the researcher observed during the data collection period). One purpose of the intervention was to make staff less dependent on materials (a stimulus-response behavioural approach), in order to develop their own communication style to provide opportunities for spontaneous communication. This conveys a number of advantages, in that materials can be lost or broken, and special spaces like the sensory room can be unavailable, but staff behaviours are always available for use as a teaching tool. For example, adults' body language, speech and timing can be used, as well as setting up communicative opportunities to give the children a chance to initiate communication. Also, AISI requires teachers to work collaboratively on how to implement the principles and to foster communicative opportunities within their class, without the need to change curriculum or timetable equipment and resources.

4.4.4.2 Solutions proposed

A variety of barriers to the collaboration between teachers and parents/families of children with autism were mentioned by the teachers at pre-intervention stage. Administration/bureaucratic barriers were generally identified as the organisational culture being hierarchical, with the management controlling everything. For example, the Autism Centre managers video-record teachers in classrooms, and being observed all the time by camera will make the staff feel conscious and might affect their practice. Alzari (2013) and Adawaidah (2014) stated that some barriers should be removed, and they mention the use of cameras in classrooms. While the management team justified the cameras as present for protection of the child, Alzari (*ibid*.) argues that this is an unrealistic reason, as management cannot really check and control everything from their control room. Three teachers (Haskoor, Yousef, Alahadal) suggested that the administration barriers could be removed, e.g. teachers have too much paperwork, there is too much instruction from management, and management approval is required for the use of anything with a child. They want to work as a team to plan for the child, but feel that they face a lot of bureaucracy if they want to try something different. For example, if they wanted to drop something from or add something to a child's plan—using a Social Story approach for toilet training, for example this must be presented to management and justified with reference to research, which staff will have to gather together themselves. There is an expectation from management that staff should have formal training before trying new approaches as well, which takes time and money to organise. These facts make it harder for staff to try something spontaneously or temporarily, and could be seen as too much trouble to go through for a small change. It encourages staff to look to outside experts for advice, as noted earlier, and restricts flexibility, despite the fact that staff acknowledge the importance of flexibility when working with autistic children. One result of this is that if a

child is unsettled on a particular day, and staff cannot follow his usual plan, staff find it difficult to try an alternative way to pursue the same learning goals or manage challenging behaviour. This can contribute to staff feeling that they lack skills.

No parent/teacher mediator is based in Autism Centre, which staff stated was a barrier to regular communication. Haskoor suggested that the centre should appoint a social worker, while Yousef said the centre could appoint a coordinator, to make *"contact with families frequently and follow-up communication between the teacher and the parents…about progress."* Such a mediator would act to liaise between the teachers and the parents, because this is not part of the teachers' or managers' job description. At the pre-intervention stage, meetings of teachers and parents were mediated by the management at the centre, there were also some ad hoc meetings between teachers and parents. However, staff felt that a more formal coordinator is needed as there is insufficient follow-up and the frequency of meetings inhibits collaboration.

Support from the parents is also needed. Olfat, Wedyan and Alahadal stated that the parents tend to rely heavily on the teacher. For instance, if the child does not improve, the parents then approach the teacher, so in their experience parent-teacher communication is more reactive than planned, regular and pro-active. With respect to the collection of evidence of teachers working, the use of video-recordings, and communication notebooks to raise parents' awareness was suggested by Alahadal. Alahadal said this would provide clear evidence for the parents of the great work the teachers are doing. Olfat also recommended increasing parental awareness through the centre giving some lectures for the parents, and parents gathering as a group to speak out about their ideas (like a focus group). She mentioned "how important the benefits are for the child, if the parents make collaboration with teachers." She felt the Autism Centre should provide lectures for

parents once a month at least, at which groups from the community could share their experience and knowledge. Furthermore, so as to emphasise the benefits of cooperation, all of the teachers discussed meeting parents to explain how important the benefits are for the child. The teachers also said that parents need to collaborate more with teachers and improve the communication between parents and teachers, as well as using communication technologies.

4.4.5 Summary and brief discussion of pre-intervention interview findings

The pre-intervention interviews provided insights across a broad range of issues and opinions that are relevant to this study. As evidenced in the preceding section, staff have a limited repertoire of approaches, but are becoming aware of and are somewhat open to trying new things. Teachers said they saw their work with autistic children as difficult but potentially rewarding. Their motivations included both external and internal factors. They believe that good practice can make a difference for the children they work with, and they have seen evidence of this in their own practice. They were able to identify a number of barriers to changing practice.

Two of these were the behavioural orientation of the current school programme, and the appeal to evidence-based practice and outside expertise. However, as noted in the literature review, many of the AISI principles are also used in approaches such as ABA and EIBI, and evidence can be shown about efficacy. The researcher saw this as a link that could be built upon. In terms of ABA/EIBI, positive impacts on IQ, language and play could be linked to adult involvement and the provision of the stimulus (Magiati, 2007). Similarly, a study by Howlin *et al*. (2007) examined the effects of PECS training on spontaneous communication of children with autism and found that the rates of communicative

initiation and PECS usage were significantly increased. These findings were supported by Gordon *et al*. (2011) who concluded that the adult involvement in PECS usage largely determines the range of communicative behaviour. Furthermore, it was reported that the TEACCH programme led to better social and interaction skills (Ozonoff and Catchcart, 1998) and that a positive correlation was observed between the school TEACCH programme and the reduction of both autistic symptoms and maladaptive behaviour (D'Elia *et al.*, 2013). Therefore, it can be argued that for the behavioural approaches of EIBI, ABA and PECS, empirical evidence supports the idea that they can positively impact the communicative strategies of autistic children. This suggests that, whilst the staff's understanding/implementation of AISI principles was limited, their pre-intervention practices provided a foundation that offers good potential for development and staff re-training with AISI. Remaining focused on only one 'language' of working with autistic children may hinder efforts to grow and sustain professional relationships with other teams and colleagues (Warren *et al*., 2011; Woo and Leon, 2013).

It was also found from the pre-intervention interviews that the teachers' knowledge and training was based upon good levels of practical experience and good academic achievements of particular relevance to SEN. Yet, although the teachers have received ongoing and regular training in several interventions, they want additional training with new strategies. On the one hand, it is positive when additional training is considered by teachers as a beneficial part of their personal and professional development. However, such comments can also be associated with the teachers' attitudes of negativity and frustration in relation to the effectiveness of existing training and practices at the centre. Some progress in developing the children's communication skills were mentioned by the respondents, but the general consensus was that much more could be achieved. Therefore,

since they are keen to receive new training and since they also appear genuine in wanting to help the children to improve their communication skills, it was hoped that the AISI will bring improvements in staff morale, in staff performance and in the children's spontaneous communication.

The teachers' negative attitudes towards the pre-intervention training they had previously been given, despite the apparent abundance of such training, suggested a degree of dissatisfaction with the pre-intervention methods. Yet it was anticipated that levels of staff satisfaction and positivity could be increased with the adoption of a new approach. It may be significant to acceptance that this method comes from the more developed, western nations. This seems to confirm the conclusions of Almasoud (2010), who stated that the standards of teaching in Saudi Arabia were below that of the United Kingdom, because of insufficient teacher training and attainment of knowledge regarding autism. In addition, the comments of Haimour and Obaidat (2013) appear to be especially appropriate because they conducted research in Saudi Arabia on the attitudes of schoolteachers. They explained that understanding teacher characteristics (in terms of their education, experience and other such factors) was important if efforts were to be made to reduce negative attitudes (Haimour and Obaidat, 2013). However, whilst the researcher bore these remarks in mind and encouraged the teachers to further discuss their opinions and needs, it was found that the teachers' pre-intervention learning and practices were based upon directional strategies rather than upon self-reflective or collaborative strategies. This suggested that the researcher could encounter insufficient collaborative input from staff when providing the teachers with an AISI strategy and principles to adopt.

The researcher also accepts the arguments of Ogletree *et al*. (2007), who imply that the style of teaching and intervention should be flexible, so that it can be tailored to the

uniqueness of each child and different environments. Some staff also appeared to recognise the value of flexibility, mentioning it as an important skill. However, the respondents' discomfort and unwillingness to use some certain principles, such as imitating the children, had to be taken into consideration, because these principles were to be incorporated within the AISI. This discomfort and unwillingness to use certain principles might have stemmed from cultural attitudes. For example, the traditional importance that is attached to honour could be a reason why imitating an autistic child might be regarded as uncomfortable for some teachers. Kim (2012) drew attention to the importance of considering cultural variations by proposing that one intervention approach should not be applied to all without adequate flexibility. His argument that an intervention should be flexible enough in order to account for cultural and individual differences is accepted by the researcher. Therefore, although the AISI principles suggested in this thesis were implemented at the Autism Centre, the researcher believed amendments should be recommended if deemed appropriate from the post-intervention interviews. Research looking into the reluctance to adopt certain strategies in Intensive Interaction has produced similar findings. Irvine, Firth and Graham (2010) highlight the issue of staff feeling embarrassed, and so not carrying out parts of the approach or preferring to not be seen doing so. Developmental interventions need to be used more widely in Saudi Arabia because they are effective in helping autistic children to learn and develop. However, adaptation may be necessary to ensure that staff are enabled to use them and that they are comfortable enough to continue doing so.

Understanding the cultural importance and appeal of experience, seniority and authority is also important when trying to effect changes to attitudes, beliefs and practice. It could be that strategies have been adopted and remained unchanged over a long period of time

because they initially came from outside experts, who made frequent reference to evidence, and who appeared to be authoritative sources. Given this possibility, in this study it was important to work with staff very closely to reflect on and enhance the way the principles are used in their day-to-day context. This helped to reinforce any gains they see, in the same way that repeated visits by outside experts had reinforced using the other methods.

If new methods were to be tried, information gained from the interviews also indicated that strong evidence would need to be presented, including ensuring that teachers were able to see efficacy with their own eyes. This required drawing their attention to changes that could otherwise be missed. Changes may have been accepted more readily if noted by outside experts who were seen as having experience, authority and seniority.

This study also found that teachers expressed their preference to learn from evidence-based practices, which may be regarded as a positive attitude. It was explained by writers such as Reichow *et al*. (2011) that there has been a significant increase in evidence-based practices in autism across the US and Europe, and this increase can be associated with the improved understanding that has been acquired of the different types of intervention. Stahmer *et al.* (2015) reported that a highly variable number of hours of training was needed to master intervention strategies, and presented interesting ideas on why this might be the case. First, teachers typically receive limited instruction in specific interventions. For example, instruction often comprises attendance at a didactic workshop and receipt of a manual. Teachers are then expected to implement evidence-based practices without the ongoing coaching and feedback that is critical for intervention mastery (Stahmer *et al*., 2015; Bush, 1984; Cornett and Knight, 2009), and school administrators sometimes mandate the use of programmes that may not align with teachers' classroom environment,

beliefs, or pedagogy (Dingfelder and Mandell, 2011). Stahmer *et al*. (*op cit*.) found that while teachers typically said that they wanted to use evidence-based practices, in reality they frequently relied on their own intuition or copied practices used by colleagues. This may be less likely in a Saudi context, where teachers do not have a great deal of autonomy within schools, and even head teachers complain of having limited ability to make their own decisions due to a centralised, bureaucratic national education system (as documented in another context by Alkarni, 2014).

This thesis responded to these conditions by setting out an AISI that was evidence-based, composed of different principles from various interventions, employed over a period of time, and offered the flexibility required to take account of the individual nature of each child in terms of their particular needs, abilities and personality. The child-centred, flexible nature of AISI and the willingness of AISI's originators to borrow effective approaches from diverse interventions (Kossyvaki *et al*., 2012) was likely to be attractive for these staff members. In its heterogeneity, AISI can be compared to the SCERTS framework (Prizant, Wetherby, Rubin, Laurent and Rydell, 2006), which also suggests incorporating approaches from different interventions when these are right for a particular child.

Barriers existed to practice change in the Autism Centre. While teachers focused on knowledge, or administrative barriers, barriers within teaching practice were also revealed. Teachers also identified collaboration between teachers and parents as an area where improvements could be made, and had practical suggestions for improving this. These ideas are similar to the claims of Ogletree *et al*. (2007), who proposed that an intervention strategy is likely to have a greater chance of developing the child's social communication if the teachers, parents and associated professionals work in close co-operation and co-ordination with one another. From this type of working relationship, a flexible intervention

(such as the AISI proposed in this thesis) can be designed and then amended when deemed appropriate. On the other hand, it should be recognised that achieving successful co-operation and co-ordination between teachers and parents/families in Saudi Arabia was not expected to be easy. This is because the cultural preference seems to be for directive instructions to be provided from the 'experts' without any real self-reflective or collaborative input from the ones receiving such directive instructions, and parents typically rely on the staff to know what the right thing to do is, and are reluctant to attend meetings to communicate directly with teachers (Alzahrani, 2014; Alkarni, *op cit*).

Overall, however, the pre-intervention interviews suggested a positive potential response to research question five: "*To what extent are adults able to change their interactive style*?" and also acted to bring the five teachers into the action research process as participants. Whilst it is accepted that the teachers expressed some negative comments (such as implying that teachers are superior to children and also mentioning negative feelings) there was potential for the successful implementation of an AISI. The teachers appeared to genuinely want to help the children improve their spontaneous communication, and they were eager to receive training and directions in new methods. Therefore, it was expected that an AISI could be effectively adopted and practised during the period of intervention.

4.5 Post-Intervention staff interview findings

The five Saudi teachers who completed the two-month autism training intervention at the Autism Centre completed exit interviews with the researcher to reflect on their experiences of taking part in an action research process during which they applied the 13 AISI principles and 9 communicative opportunities for communication with the same children.

This was done in order to explore any changes in the teachers' perceptions during the intervention, and to evaluate their willingness to continue using the principles in the future. The data was analysed and results are presented below under a series of headings. While earlier sections of this chapter explored their willingness pre-intervention to change their interactive style, the following section will provide some evidence about the extent to which teachers were able to actually do so, and through exploring their experiences, identify key factors in that process.

Responses to the post-interview questions were organised under the following eight headings, using an Excel spreadsheet to manage the data: (1) Interactive style influences communicative ability; (2) Use of AISI; (3) Frequency of communication initiation post-intervention; (4) Situations that prompt the child to communicate; (5) Effectiveness of the principles; (6) Changes noticed since AISI programme was introduced.; (7) Long-term outcomes; (8) Difficulties in understanding and implementing AISI principles. Subsections within these sections are based on themes that emerged from the post-intervention interview data.

Interviews took place following the implementation of the AISI principles. During this period staff accessed workshops, lectures and training as well as changing their classroom practice. The following is an in-depth analysis of the teachers' experience and perception of implementing AISI principles in the Autism Centre.

4.5.1 Interactive style influences communicative ability

Participants were asked whether they felt that the change in their interactive style, as applied to their students and everyday practice, had influenced the children's communicative ability. In general, all five participants were convinced that indeed there

had been a positive change in the children's communication abilities, and that this change could be tied to the new interactive styles implemented in the frameworks of the intervention. All five participants highlighted the importance of sharing ideas with the researcher as a way of improving their practice. They focused on the significance of reflecting on their existing practice and how they might build on this.

All five participants agreed that by providing the children with opportunities to communicate, they were able to elicit interaction, which in turn increased the child's communication attempts. For instance, Yousef stated that *"whenever the right environment for communication is in place, the challenging behaviour of the child will decrease because it gives the child an opportunity to express him or herself."* Haskoor had taken this one step further, reflecting upon the underlying reason for the manner in which the staff interacts with the children: *"staff react too fast or do not give the children enough opportunity, which in turn results in the child not being able to take initiative in communication."*

This understanding is in line with the AISI guiding principles, according to which adults must provide the child with time to process information and expand the communication. In addition, AISI principles prescribe that the adult should use a variety of principles to ensure flexibility and enhance spontaneous communication. These tactics help to create the "right environment" to which Yousef referred.

Thus, it seems that not only did the participants perceive a direct correlation between increasing communication opportunities and increased communication attempts, but they were also able to further reflect upon possible barriers to implementing these changes in interaction styles, mentioning that the staff had previously tended to react quickly to a

child's behaviour, therefore not allowing for a mutual interaction, but rather remaining at the action–reaction level. As the next section will show, this willingness translated to measureable practice change.

4.5.2 Use of AISI principles

When asked to comment about the relative ease of use in regards to implementing AISI principles, most teachers focused on the fact that the intervention encourages and facilitates flexibility in working with the child, and did not refer to the ease of using the intervention. However, two teachers, Haskoor and Alahdal, did refer to a factor that facilitated easy implementation of the intervention: the use of informative videos that explained and demonstrated the principles. For instance, Haskoor stated that *"the intervention is easily brought into practice because it uses informative video to explain these principles,"* and Alahdal said that *"after I was exposed to the intervention and its principles through the video recordings, my approach when interacting with autistic children has changed dramatically."* While Alahdal related to the videos as part of the general transmission of information, Haskoor stressed the tangibility afforded by using video. In addition, Haskoor stressed the importance of creating a common language between the teachers: *"what makes this intervention unique is the fact that one can exchange the experience of implementing the principles of the intervention with others."*

Thus, it seems that the manner in which the intervention was conveyed also played a part in shaping the perception of it among the teachers; as they all said at one point or another, change is not easy for teachers. Nor is it easy for children, especially when it comes to children diagnosed on the autistic spectrum. It could be argued that AISI training reflects its own principles: it encompasses a variety of teaching methods, therefore trying to meet a

variety of learning needs. These needs, in turn, are met for each teacher on his or her own level – while some focused on the actual implementation and referred to ease of use via following the instructions and implementing strategies, others referred to the ability to communicate their own experience to their peers, and said that they viewed the programme as providing a new method of communication with each other. This was also iterated by Yousef, who said that *"changing the interactive style depends on the child,"* thus referring to the fact that there is no 'one size fits all' solution.

One of the main ideas guiding AISI principles is to relate to the child on their own terms: 'respond to all communicative attempts' and 'follow the child's lead or focus of attention.' The teachers' reference to AISI's ease of use may in fact reflect the implementation of these principles in AISI training, not only in working with autistic children.

4.5.3 Frequency of communication initiation post-intervention

All five participants reported an increase in the frequency of instances in which the children have initiated communication following the pre-intervention phase, attributing this increase to the fact that they have begun creating 'opportunities' for the child to communicate. Alahdal referred to *"a significant increase in the level of communication, especially when the child was given ample time to initiate the communication"*; Olfat stated that [the intervention] "*prepares the child to respond more accurately. It gives the child a chance to communicate more"*; and Haskoor said that *"by applying this method, one has essentially created an environment conducive to the child's interaction with the professionals."* Yousef stated that *"the frequency has increased post intervention, and I think the children seemed more aware of the presence of the adults. They showed this by approaching the adults, looking at them, smiling and vocalising as well."*

Once again, we see that participants stress the fact that the intervention had allowed them to create a facilitating environment. As noted in Chapter 1 and Chapter 3, the Autism Centre previously implemented primarily behavioural approaches, in which they focused on responding to, and shaping,the child's behaviour. Learning the principles behind AISI and seeing that it produced positive results has clearly had an impact. The teachers' statements reflect not only a theoretical understanding of the AISI principles, but also a change in paradigm: they have made a shift from a functional–behavioural perspective to a more dynamic understanding of communication disorders as encompassing cognitive, emotional and behavioural difficulties, and of their own contribution to communication as a communication partner. It was evident from the video recordings that when staff changed their behaviour, spontaneous communication increased, and in post-intervention interviews staff said they felt more confident about their ability to create situations that elicit communication, as illustrated by direct quotes presented earlier.

4.5.4 Situations that encourage the child to initiate communication

In order to further deepen the teachers' reflection on the intervention, they were asked about the situations in which AISI principles may be the best course of action.

Four of the five teachers referred to situations in which the children have a new opportunity to communicate – namely when they need something, such as food or to use the bathroom. They stressed the teacher's role in creating a facilitating environment that creates the time and space for the child to communicate on his or her own terms. Olfat, on the other hand, referred to the use of imitation as a means to enter the child's inner world, while also having the patience to wait for the child to communicate.

4.5.5 Effectiveness of the principles

Teachers were also asked to rank the effectiveness of each of the AISI principles on a five-point Likert scale (see *Appendix 8* for full ranking results). After they had rated the principles, the researcher then asked them to justify their ratings. When asked to refer to the AISI techniques they felt worked best for them and their students, three teachers replied that the most important factor was creating a sense of non-intimidating presence. This presence, according to Alahdal, allowed *"the child to feel the presence and availability of the professional, while giving the child space and opportunity to ask."* Olfat added that *"I think all of the principles are effective, but the principles based on showing availability to the child and gaining the child's attention are fundamental processes within the process of communicating with the child."* Yousef said that all of the principles are important for him, as they give him more opportunity and freedom in school to use multiple strategies to facilitate children's communication.

Most teachers said that some of the communicative opportunities were not often used, either pre- or post-intervention (e.g. to give a child non-preferred items or especially to contradict their expectations, which was not used at all). Staff chose not to use them widely for fear of upsetting the children, because they were at a very early stage of their communicative development and this might have discouraged further communication.

Haskoor rated all of the principles as the best and most effective, except contradict expectation and assign meaning, as he felt they are quite difficult to implement. He realised that he had hardly used some principles before, but said that he now understood the importance of using all the principles all the time. He agreed that some of the communicative opportunities were used less for fear of upsetting the child, but added that

it is important to use them for a long time to facilitate the child's communication. He also mentioned that when using the principles he saw some advantages with his own eyes, as the staff used creativity to create situations and obstacles for the child in order to make the child interact.

Alahadal rated most as five and some of them as four, except 'contradict expectations' (rated two). He said: *"These principles show that perhaps the children can become more aware of the adults, and they give the child more confidence and opportunity to communicate more."* He saw that his child increased his communication at post-intervention, and he noticed that his child's communication improved and increased. He also stated that he became more confident using these principles and saw the benefit of them quickly.

Olfat rated most of the principles as most effective (rated five to four) except 'contradict expectation' (rated two, less effective) as she rarely used it, and 'assign meaning' as she stated it is quite difficult to implement. Also, she mentioned that she strongly changed her mind about imitation and mirroring the child. She was impressed with the principle of interacting with the child and she supported it, rating it as effective. She perceived how effective it was when she used it with her child, as she noticed the increasing development of her child. However, teachers recognised that the best way to get into the child's world was through imitation – they have seen how the children are happy with copying actions.

While Wedyan agreed that *"mirroring the child is beneficial and she recommends it for people who are able to imitate physically or verbally during the camera recording and who can do speech imitation,"* she said she found it difficult. I discussed this with her and several explanations emerged. She reported that she had been self-conscious in front of the

camera, and also that her child was upset at the end of the training and post-training due to a reduced dose of medication.

The discussion with the teachers gave a clear understanding of the basics of the AISI principles relating to how the behaviour of adults and their interactions with children affect and facilitate the child's communication. The more they practised the application of AISI, the more confident they became. Some teachers began to match and tweak the practice to the temperament and abilities of individual children. One teacher linked a communicative and responsive environment with a reduction in disruptive behaviour of the child.

Most of the teachers referred to restrictions imposed by the Autism Centre's management. They had not used child imitation previously because of the limitations imposed by the centre's management. They had been told that imitation would amplify negative behaviour. However, following this research, they have been given the green light from the management to implement the AISI programme, and have therefore had more of an insight into the importance of communicating with the child. The general impression from the teachers when commenting about the AISI intervention is the flexibility of using the strategies – they can use more than one principle at the same time in order to increase the initiation of communication.

During the training sessions, which involved explaining and discussing the AISI intervention, they were highly impressed and motivated, and showed off their own practice in which the AISI principles had been seen in action. For example, during the training lectures, teachers recognised that they had been inclined to speak pre-emptively and to speak excessively with the student, and sometimes didn't give the child a chance to respond. Staff stated that they have not felt comfortable enough to use some

communicative opportunities, such as 'contradict expectation,' and also said they need more time and creativity to achieve their best with approaches they found challenging. All the teachers agreed that gaining the child's attention is very important, as it is a key factor in creating a communication interaction.

The approaches most valued overall by the staff at the post-intervention stage were ranked, as shown in *Table 9*, below.

Table 9: List of most valued overall AISI reported by the staff at post-intervention stage

Table 9:	
List of most valued overall AISI reported by the staff at post-intervention stage	
1-	Responds to all communicative attempts
2-	Expand on communication attempts
3-	Gain child's attention
4-	Wait for initiation
5-	Use minimal speech
6-	Provide time to process information
7-	Exaggerated pitch, facial expression, gesture and body language
8-	Show availability
9-	Use non-verbal cues
	Communicative Opportunities:
1-	Give small portion
2-	Make items inaccessible
3-	Stop part way

Staff expressed concern regarding the principle of assigning meaning to the child's random actions and sounds. Furthermore, they described its implementation as difficult, because it required some creative thinking.

Overall, staff concluded that creativity should be a core element for all AISI principles. Staff were likely to repeat the same routine at times once they had come up with an idea that encouraged children's spontaneous communication. However, attention to changing

routines was important, because accepting change is a common difficulty for autistic children (Bogdashina, 2005; Jordan, 1999) and repeating the same routines may promote rigidity rather than spontaneous communication.

4.5.6 Changes noticed by staff since AISI intervention was introduced

Three of the five participants referred to changes in their own pattern of communicating with the children. In addition, Alahdal and Olfat both mentioned that by increasing their communication repertoire, they felt more confident applying the AISI principles and Haskoor said that the changes have *"encouraged"* him to *"keep using these principles."*

Some of the AISI principles may at first cause the teachers to feel embarrassed or self-conscious, such as being asked to imitate the child, use exaggerated pitch, body language and gestures, and respond to all communicative attempts. These difficulties were mentioned by the teachers, but they also said that once this barrier was removed, they found within themselves greater flexibility and perhaps some inner strength they never knew was there.

More information regarding changes in staff communication behaviour can be found in *Chapter 5: Results—Implementation of AISI principles by staff*. In this chapter data derived from video-taped observations of staff working with children is discussed, documenting the ways that staff changed their behaviour using AISI.

4.5.7 Long-term outcomes

In general, all five participants stated that they felt the AISI principles can be implemented in the Autism Centre and can be integrated into the staff's regular repertoire. However,

they did mention that some components may not be appropriate for the Centre, whether for structural, administrative, cultural, religious or personal reasons.

For instance, Haskoor said *"I had not used some of the principles before, such as 'imitation,' due to the restrictions imposed by the centre's management, because it was afraid that it may increase inappropriate behaviour and also because I just feel less comfortable with being filmed."* The staff must follow the guidelines that have been agreed by the management team in the Centre while looking after the children, as they are being filmed every day in class via the CCTV camera built into the classroom. Yousef also stated that management restrictions had an impact on his willingness to use some principles until after management changed its views. These comments draw attention to ways that surveillance of staff or rigid workplace rules could constrain staff practice negatively.

Wedyan said:

> *"I started using this intervention very early on in its introduction and I was impressed with the intervention's results. Hence, I became very confident in applying its principles. The reason I did not use some of these principles previously is that we were getting ourselves familiar with these principles prior to their practical implementation. Also, the management required us to follow the guidelines. However, now we have been fully allowed to implement the intervention."*

4.5.8 Difficulties in using some AISI principles

When asked about other factors that were not positive during the intervention, and why and when they would or would not use a certain principle, the teachers further affirmed the understanding that a principle is not always right all the time for all the students.

Wedyan mentioned that some of the principles seemed to upset the child, and she would therefore avoid using them. For example, 'give the child non-preferred items' was not one that she found easy to try, as her child was very anxious. Alahdal mentioned a similar apprehension:

> "*I do not use some of the principles solely because of fear I might upset the children, thus discouraging further communication*."

Teachers further affirmed the understanding that a principle is not always right all the time for all the students. Haskoor mentioned the importance of context:

> *"It depends on the communication situation and the environment of communication. It is impossible to use them all in one sitting, for example, some situations need the use of three principles."*

This was also evident in the fact that Haskoor was among the teachers who made minimal to no use of seemingly non-conventional methods such as exaggerating, following the child's lead, assigning meaning to random actions or sounds, and imitation.

Yousef referred to the fact that at times the child is unable to participate due to his or her emotional state at that specific time: *"it depends on the situation and the environment of communication. The situation offered me the use of some principles rather than others. To justify not using a principle: sometimes a child has bad day and I may fear upsetting the child."* In addition to mentioning the child's subjective state, Wedyan also referred to the

fact that the teachers are human beings as well, and may forget or feel that a certain principle is not right for them at the time:

> *"Sometimes we forget something that might be important but this is a human mistake. Also, it depends on the situation or environment of the communication. Moreover, sometimes the child comes to the centre with a lack of sleep or something else that makes some communication difficult and just requires behaviour modification."*

Olfat reiterated the limitations that can come from the teacher's end:

> *"Sometimes I forgot, and when I remembered, for example during breakfast, it was difficult to hide the spoon or straw, and I was afraid that it can be upsetting for the child."*

It is interesting that all staff agreed that the 'contradict expectations' principle should not be used, as they have not used the contradict expectation either pre- or post-intervention. While they have cited fears of upsetting the child, it could be that staff held a different definition or understanding of this principle than was intended. Of course, disruption should be minimised in the classroom, but fear of disruption should not necessarily prevent trying something new.

The principle of assigning meaning to the child's random actions and sounds was another that staff found challenging to use, but it is supported by the literature (Flack *et al*., 1996; Christie *et al*., 2009). It is in many aspects similar to interpretation, one of the principles of the Hanen approach. Manolson (1992) asserts that the child knows his parents are

listening even if his message is misinterpreted by them. Bruner (1981) claims that this process is identical to the way mothers teach their toddlers to speak – by constantly assuming the child's expressions are intentional, they encourage them to intentionally verbalise.

The reasons that some AISI principles were used more frequently than others could be related to some of the staff's individual characteristics, such as personality, professional status, experience or self-confidence. At other times the children's features had an impact, for example: age, verbal ability, and frequency of spontaneous communication.

Overall, staff concluded that creativity should be a core element for all AISI principles. Staff were likely to repeat the same routine at times once they had come up with an idea that encouraged children's spontaneous communication. However, variation needed to be considered for two main reasons: accepting change is a common difficulty for autistic children (Bogdashina, 2005; Jordan,1999) and repeating the same routines may promote the children's rigidity rather than spontaneous communication.

4.5.9 Summary and discussion of post-intervention interview findings

The post-intervention interviews generated findings that were generally positive with regards to AISI leading to improvements in the children's communicative abilities. Overall, the five teachers who participated in the interviews stated that AISI brought increases in the children's initiated communication. Therefore, these findings offer support to the transactional model of child development, because this model proposes that the development of the child can be influenced by the behaviour of adults (Wetherby and Prizant, 2000). Similarly, the post-intervention interviews also confirm the idea that the

adults should accept the same, or more, responsibility for the success or breakdown of adult-child communication (Willis and Robinson, 2011).

Furthermore, in addition to developing spontaneous communication from the children, teachers said that learning about the AISI assisted them in their own professional development. By focusing attention on amending their own behaviour in order to elicit higher levels of initiated communication from the children, the respondents were able to implement a range of AISI principles and so improve their own skills as effective teachers. This change in approach can theoretically be generalised by teachers in other contexts.

It was also found from the post-intervention interviews that the AISI had encouraged the teachers to attain an improved understanding of autism. Inadequate teacher training (with respect to the attainment of knowledge of autism) had been identified as a problem in Saudi Arabia (Haimour and Obaidat, 2013). So the findings suggest that the adoption of the AISI can help in addressing inadequacies in staff training and thereby improve the teachers' practices and professional performances. In particular, they were now more able to perceive autism as a communication disorder as opposed to being simply a behavioural issue. In addition, the teachers' increased awareness of the developmental and transactional nature of autism meant they no longer based their practices so heavily on aspects of the medical model. Through the self-awareness of their amended practices, they were now coming to the conclusion that the focus should not be based solely upon the child when seeking to evaluate progress and success.

The medical model proposes that the autistic child should be the focus of attention, be treated, and then be adapted to a society that is pre-determined and set (Rieser and Mason, 1990). However, the teachers now appear to be moving away from such concepts towards

ideas associated with the social model of disability, focusing on how adaptations to the environment to allow for an individual's difficulties can prevent or limit disablement (Tregaskis, 2002). The post-intervention interviews showed that the application of the AISI created an environment that was conducive to the children's interaction with the teachers. Therefore, since the lack of interactivity between autistic children and adults had been identified as an issue worthy of particular attention, this finding may be regarded as a successful step towards facilitating higher levels of spontaneous communication from the children.

The teachers' post-intervention comments that the AISI created an environment that was conducive to the children's interaction with the teachers also imply confirmation of the arguments of Potter and Whittaker (2001). These authors developed the concept of enabling environments, where their intention is to assist school staff to create environments that are communication-enabling for autistic children. The approach of Potter and Whittaker (*ibid*.) proposes that intervention should be consistent as well as structured, that tasks should be divided into manageable parts, and that the child's communication behaviour should be provided with social support. They further recommend that intervention should focus on the capacities of the child, with a responsiveness that is flexible according to the spontaneous communication of the child (Potter and Whittaker, 2001).

The communication-enabling environment and flexibility offered by the AISI are in accordance with these recommendations. Indeed, the teachers mentioned being especially impressed with the flexibility that was offered by the AISI principles. They discussed the advantage of being able to use more than one principle at a time and also being able to select different ones depending upon the particular context. If a certain principle upsets the

child, was deemed to be ineffective, or was found to be inappropriate or unsuitable, then that principle could easily be changed for another one. This flexibility is especially important when considering how these principles might be adapted for use with children who are more able.

Indeed, critical to the successful adoption of the AISI was the positive attitude of the teachers towards receiving new training and applying new strategies. They were eager to learn, and this was reflected in the good understanding of the AISI principles that was achieved by them.

Overall, the post-intervention interviews highlighted the successful implementation of the AISI in terms of increased levels of spontaneous communication from the children and also in terms of improvements in the teachers' knowledge, skills, performance and positive motivation. These subjective findings can be compared with the quantitative data presented in *Chapter 6: Results—Children Data*. In the final section of this chapter, the findings from both the pre-intervention and the post-intervention interviews will be discussed together. This will assist in clarifying any issues, developments or improvements (with respect to both staff and children) through a comparative discussion of the pre-intervention and post-intervention interviews.

4.6 Discussion of combined pre-intervention and post-intervention interview findings

In order to provide an overview of the qualitative data generated from the interviews, the pre-intervention and the post-intervention interviews will now be discussed together, with reference to respondents' comments across the four main subject headings as established

in the first (pre-intervention) part of this chapter. This will allow an evaluation of the AISI implementation carried out at the Autism Centre.

While the staff's understanding/implementation of developmental and adult-focused approaches was limited at the time of the pre-intervention interviews, their practices did suggest there was a good foundation for development and staff re-training with AISI. Teachers stated that these practices achieved some improvements in the children's ability to initiate communication during the pre-intervention period, but it was generally accepted that far more could and should be done. The adoption of the AISI may be regarded as a success in this regard, and the researcher believes that building from existing good practice was a key factor. There is also a possibility that the staff embraced the AISI because it was an approach developed in the UK and because the researcher presented it in a way that appealed to their desire for 'evidence-based' practice. However, any initial enthusiasm would have probably quickly changed if they had not found it beneficial and had not had the flexibility to use it. Of course, adoption and implementation has not been perfect, and staff definitely had preferences for some principles over others. The researcher believes it was also important that expectations were managed. Staff achieved measurable positive success in increasing childrens' spontaneous communication, but had they been led to expect huge changes, they might have quickly become disillusioned.

The post-intervention interviews demonstrated that the teachers had competently amended their practices to an approach that incorporated AISI principles from a wide range of interventions, and which focused the teachers' minds on adjusting their own behaviour and interactions with the children in order to increase spontaneous communication from them. The post-intervention interviews also suggest that the adoption of the AISI has led to practices which can be described as being primarily developmental, incorporating aspects

of the transactional model of child development (Wetherby and Prizant, 2000) as well as creating environments that are communication-enabling for autistic children (Potter and Whittaker, 2001).

It was shown above that 9 of the 13 AISI principles were rated as highly effective by the teachers in the post-intervention interviews**.** Four of these – 'show availability,' 'wait for initiations,' 'use minimal speech,' and 'use non-verbal cues' – were also among the five principles that were most commonly used during the pre-intervention period. This suggests some association between pre-intervention and post-intervention practices, but also evidences that teachers now assigned effectiveness to many more AISI principles post-intervention. The teachers were already comfortable and experienced in the use of the four principles that were highly rated pre-intervention, and they were content to continue applying them along with some improved adjustments.

Just one of the popular pre-intervention principles, 'offering choices,' was not chosen as one of the most effective principles during the post-intervention interviews. Although staff witnessed the results in increased spontaneous communication that could be achieved from the range of AISI principles, and all participants agreed that offering choices is easy to understand and easy to implement, their comments indicated that increasing their use of this principle was a challenge. For example, Haskoor stated that they:

> *"were able to offer choices all the time, but most of the time we forget to offer choices. We tried to shift from prompting the child (forcing him) to offering him choices."*

Olfat added that she now could see that offering choices worked well to increase the child's communication and took little effort to implement. Statements like these indicate that effective AISI principles may sometimes need to be deliberately built into everyday activities, so that teachers do not forget to use them.

The AISI principles rated as most effective in the post-intervention interviews but which were not popular during the pre-intervention period, were the three principles of 'gain child's attention,' 'respond to all communicative attempts,' and 'use exaggerated pitch, facial expression, gestures and body language.' Given the negativity that the teachers associated with these three principles during the pre-intervention interviews, it is noteworthy that they were now rated highly. This suggests that Saudi teachers should be firmly instructed to apply such principles, because it is through their successful and practical implementation that the teachers will come to appreciate their value.

The post-intervention interviews also showed that the teachers were especially impressed with the flexibility offered by the variety of different AISI principles. Therefore, it can be argued that the AISI conforms to the claims of Ogletree *et al*. (2007) who argue that the form of teaching and intervention should be flexible so that it can be amended specifically to the individual needs of each child and different environments. In the same way, the AISI may also be regarded as meeting the communication-enabling environment and flexibility recommendations, as set out by Potter and Whittaker (2001).

Given the Saudi cultural perceptions linked to honour, and hence the particular pre-intervention negativity towards the use of exaggerated pitch, facial expression, gestures and body language, it is positively significant that such cultural barriers could be overcome. However, the post-intervention interviews still offer support to Kim (2012) who

highlighted the importance of considering cultural variations by proposing that one intervention approach should not be applied to all without adequate flexibility. Teachers may need more support, for example explicit encouragement from management, to overcome their reluctance to use some principles. It may be a 'step too far' for some very reserved, traditional staff, who may on the other hand have excellent skills in other areas. It is important to recognise that both cultural and individual factors will always have an impact on staff behaviour. Providing examples, providing workarounds (such as the use of toys or puppets), and experiencing success can help increase use of principles that staff find challenging.

Of course, it can also be argued that if staff are reluctant to use some principles for cultural reasons, that these principles should be set aside. In response to this, it must be acknowledged that the way young children learn to communicate can be helped or hindered by cultural practices. Cultures are not static, and there has been substantial change in parenting and education practices in Saudi Arabia over the past 100 years (Khalifa, 2001.) When research results in information indicating that a particular practice is counter-productive, staff should consider ways to change that practice. This may require small, gradual steps rather than wholesale change, such as blending old and new practices, as has been pointed out in the context of new forms of English language instruction in Saudi Arabia (Abdel-Salam, 2014). Although Abdel-Salam found that staff struggled to encourage pupil autonomy due to restricted syllabus outlines and assessment procedures in international schools in Saudi Arabia, he noted that this principle had been found effective by teachers who did try it. He found that teachers managed cultural conflict by using new methods alongside old methods. In response, he wrote, *"we can consider these principles appropriate if we overcome challenges that hinder the use of them"* (*ibid*.: p. 35}.

In terms of knowledge and training, good levels of practical experience and good academic achievements of particular relevance to SEN were identified during the pre-intervention interviews. Also, despite ongoing and regular training in ABA, TEACCH and PECS, the teachers said they wanted to further increase their knowledge and skills with additional training. This keenness and willingness to learn was further expressed in their preference to learn from evidence-based practices, and this appears to have played a role in their enthusiastic uptake of the AISI since it was presented as an evidence-based practice. However, this still plays into the teachers' preference for looking to experts from outside the school or outside Saudi Arabia. Since the teachers maintain a strong cultural preference for learning from directional strategies, this can be used as done in this research: to encourage self-reflective or collaborative learning. If they can be encouraged by authority figures to see that they are able to generate their own evidence, as they have done through participation in this action research project, they will be less reliant on outside expertise.

The improvements in teacher performance as well as in the children's development (as brought about by the effectiveness of the AISI training) help to address the concerns of researchers such as Almasoud (2010). He had drawn attention to the relatively low standards of teaching in Saudi Arabia because of insufficient teacher training and low attainment of knowledge regarding autism (Almasoud, 2010). Likewise, Haimour and Obaidat (2013) had also highlighted the need to address inadequate teacher training with respect to the attainment of knowledge of autism within Saudi Arabia (Haimour and Obaidat, 2013).

One can also question the assumptions of researchers like Haimour and Obaidat, who assume that *all* teachers in the West have a much higher level of autism training. In fact,

the teachers at the Autism Centre have a level of training that is equivalent to training levels typically found in UK autism provision just a few years ago. Only later this year (2016) will some training on autism become required as part of Initial Teacher Training in the UK, for example, and both inclusive and special schools in the UK often struggle to find staff who have specialist expertise in autism interventions. Baker (2012) highlights the lack of training many US teachers receive regarding autism. However, the staff statements reveal how much the Autism Centre and its staff rely on external experts from the US, UK and Europe, which has no doubt led them to believe that in the countries these experts come from, all teachers are highly skilled. It is possible to relate this disparity between actual training level and teacher confidence to teachers' preference for authoritative solutions, i.e. being told what practices to use. They will adopt new practices if directed to do so, but unless there is a collegial, cooperative environment to discuss it, any approach will tend to be applied as a set of rote skills—and therefore be less effective. One way to respond to this preference when introducing AISI would be to stress its evidence base and to have training and support delivered by outside experts. Culture change within the school, to foster more collaboration, will be more difficult but the experience of taking part in a collaborative action research project has shown staff that they can themselves generate useful data, use it to amend practices, and see positive results. To cement this important development, the school's administration will need to be convinced that this approach will actually improve staff skill and competence. The fact that following the action research cycle reported in this thesis, staff have been given permission to use the AISI approach is a step in that direction. However, more work may be needed to convince the administration that their teachers have an adequate knowledge base to experiment a bit without risking the goal of good outcomes for students at the Centre, and that in fact students are likely to benefit from staff trying new things on their own initiative.

The adoption of the AISI also helped to improve staff attitudes at the Autism Centre. Although the pre-intervention interviews did show that the teachers had a few positive feelings related to the children's improvements, salary and future training, such expressions of positivity were relatively rare as compared to negative comments. Also, whilst the teachers did say they were genuinely happy when improvements in the children's communicative abilities improved, the positivity they attached to potential future training can be linked to their overall dissatisfaction with existing training and work practices. Similarly, the fact that most teachers mentioned the high salaries as one of the most important aspects of their job satisfaction could suggest they are mainly motivated by financial rewards. Of course, earning a salary is the reason why we all go to work. Yet, for teachers who have chosen a career based upon helping and caring for others, it is surprising that the salary was such an important motivation for them. Instead of regular expressions of feeling happiness and pleasure at assisting autistic children, the teachers' remarks during the pre-intervention interviews revealed negative attitudes associated with pressure, frustration and difficulty.

Therefore, the implementation of the AISI was a success in this regard, because the teachers developed more positive attitudes towards their work as they witnessed improvements in the children's spontaneous communication, as well as perceiving improvements in their own knowledge, skills and performances as teachers. More could be done to support them in this regard. AISI encourages teachers to measure their own growing competence at stimulating interaction and communication, rather than measuring their efficacy only in terms of children they work with reaching pre-set goals. If teachers grow in confidence, this is likely to impact job satisfaction.

On the other hand, although a variety of facility improvements, barriers and solutions were identified during the pre-intervention interviews, and a variety of solutions for the removal of barriers to collaboration between teachers and parents/families were suggested, the post-intervention interviews imply that only limited success was achieved during the period of intervention. Most of the barriers identified will require more time for these to be effectively overcome, and are not related to the AISI intervention that was researched in this study. For instance, teachers' wishes for a parent-staff liaison, a big game hall, a sensory room, an external environment that contains some plants and animals and more modern technologies are unrelated to AISI, and will need a longer period for implementation. Some material barriers continue to exist due to the lack of resources and support, although more support has been provided with regards to knowledge and ideas.

Some improvements have been made in terms of removing various administrative and financial barriers, yet approval is still usually needed from higher authorities, and the lack of financial resources continues. Similarly, the cultural barrier of the non-acceptance of new ideas by families and administrators had not been entirely eliminated by the time of the post-intervention interviews. It is interesting that someone introduced to parents as a researcher from the UK bringing knowledge of the latest educational trends appeared to make staff, families and administrators more open to change. It could be useful to further research strategies that lead staff to further develop and believe in their own expertise.

Significant improvements could still be made in terms of increasing parent/teacher communication, co-operation and co-ordination in order to deliver better results in the children's spontaneous communication. Ogletree *et al*. (2007) argued that this type of intervention strategy, where the teachers, parents and associated professionals work in close co-operation and co-ordination with one another, is likely to have a greater chance of

developing the child's social communication abilities. The following chapter will present results regarding the adults' ability to adjust their interactive style by applying the AISI principles.

CHAPTER 5: STAFF RESULTS (AISI IMPLEMENTATION)

This chapter discusses how Autism Centre staff implemented the 13 general AISI principles and 9 opportunities for communication before and after the AISI intervention. General AISI principles relate to the adults' body language, speech and timing, whereas communicative opportunities are situations adults set up to give the child the chance to practice spontaneous communication. Please see *Chapter 2: Literature Review*, for more information about the research that underlies each principle and communication opportunity.

The results reported in this chapter are based on the analysis of video data, which was collected and analysed to see how and to what extent adults were able to change their communication style while working with children on the autism spectrum, on data recorded directly by the researcher during staff practice of AISI, and from discussions with the staff reflecting on their practice.

5.1 Video recording data and data coding - staff

Video recordings were made across three 40-minute activities (breakfast, one-to-one activity, and unstructured play activity) for each staff member while they worked with a child, resulting in two hours of recorded data pre-intervention and two hours of recorded data post-intervention for each staff member and each child (coded separately). The video recordings were analysed to determine how frequently staff implemented the AISI principles and communicative opportunities pre- and post-intervention.

The same video recording data was also analysed separately, with a focus on the child's spontaneous communication. The results of this analysis are presented in *Chapter 6: Results–Children Data.* The two sets of video data considered together provide an indication of whether changes to adults' communicative style had significant impact on children's spontaneous communication.

For the purpose of measuring the implementation of AISI principles by staff members pre and post-intervention, the Adult Interative Style Coding Checklist (AISCC) was used to code the data. The AISCC was adapted from a previous study by Kossyvaki *et al*. (2012) and can be found in *Appendix 3: Adult Interactive Style Coding Checklist*. Every time the staff member was observed to be using one of the AISI principles, an occurrence was coded. A five-second rule was put in place for adult's coding as suggested by previous study (Kossyvaki *et al*., 2014) if the staff continued to use the same AISI principles for more than five seconds, a second occurrence was recorded. Applying this rule would have been impossible without video recording.

Cohen's *d* effect sizes were calculated as an index to determine the magnitude of pre–post change. Cohen (1988) defined effect sizes as: small (0.2), medium (0.5), and large (0.8). *Table 10* (below) displays the mean (average) number of times that the staff used the principles and communicative opportunities, across all three activities. Tables that look at implementation by activity were also created (see *Appendix 20*) for the breakfast activity, the one-to-one activity and the unstructured activity. Data from the video recordings was also used as the basis for a comparison of the five staff members, using figures to illustrate the variation in how frequently they each used the AISI principles and communicative opportunities pre- and post-intervention. The data collected was placed into spreadsheets

using Microsoft Excel, making calculations and comparisons more manageable. *Table 10* in *Section 5.2* of this chapter presents mean data from the videotape data, and further data about how staff used each AISI principle and communication activity is presented in *Section 5.3* and *Section 5.4*.

5.1.1 Staff evaluation checklist and field notes

In order to perform high-quality research, a considerable amount of effort was put into ensuring the accuracy of implementation (Jones and Jordan, 2008). According to Kasari (2002), accuracy checks should be used to evaluate the extent to which implementation adheres to the requirements. Different kinds of internal and external accuracy checks can be used (O'Donnell, 2008). Firstly, it is possible to appoint an observer who provides feedback regarding compliance with principles and an overall rating. An evaluation checklist, when combined with field observation of accuracy, tends to produce data which indicates higher accuracy (Emshoff *et al*., 1987).

For this study, the video recordings were analysed to assess the level of compliance with the AISI principles by the researcher, as described above. Moreover, the researcher observed the staff directly and filled in a staff evaluation checklist designed to determine the frequency of AISI use during the entire teaching day (see *Appendix 4*). It would have been an imposition on the staff's workload to ask them to fill out the staff evaluation checklist, as they would have then needed to tick off each AISI principle or communication opportunity as they used it throughout their work day, while trying to carry out their teaching duties at the same time. For this reason, the researcher took on this task, observing staff practice directly and ticking off each AISI principle on the staff evaluation checklist as staff used it. The staff evaluation checklist offered three broad options for

categorising whether staff had used AISI principles, specifically 'not at all', '1-5 times' and 'many times'. The researcher then calculated an average frequency of use, based on observation of the teaching sessions using the staff evaluation checklist (*see Appendix 7*).

The data collected via the staff evaluation checklist was then discussed with staff at either at the end of the class or the end of the day. These relatively immediate after-work discussions with staff about practice were part of the action research methodology. Using the staff evaluation checklist as a point of reference helped to remind staff of the AISI principles and communication opportunities, and provided regular opportunities for staff to reflect on their practice, any difficulties, how they felt about the principles, and whether they had found the principles easy or difficult to implement in the situations they encountered that day. In this stage of observation and discussion with staff, the researcher also took field notes while observing staff, and also made notes recording how the staff themselves reflected on their practice. These after-work discussions were relatively informal, although the researcher showed staff the staff evaluation checklist for the day, which specified the exact number of times they used each AISI principle or communication opportunity, and discussed the day with them in terms of implementing AISI. This was intended to provide continual support for staff as they worked towards changing their practice using the AISI. Staff asked questions, discussed problems, and came up with ideas for further practice during these sessions.

5.2 Mean use of AISI principles and communicative opportunities across staff

It is evident that the staff's use of AISI principles prior to and following the intervention showed an increase in the use of all thirteen principles. The most prominent increase was seen in the use of expanding on communicative attempts (change score of 9.60, Cohen's *d*

of 2.68) and waiting for initiation (change score of 7.80, Cohen's *d* of 2.35). Interestingly, these principles were used quite frequently prior to the intervention. The lowest change score, meaning the smallest change, occurred in behaviours that were previously very rarely used. These included imitating the child, following the child's lead or focus of attention, and assigning meaning to random actions or sounds (change scores of 2.80, 1.40 and 1.00, respectively). This research provided clear evidence that prior experience and confidence in using a particular principle played a major role in its adoption as a regularly used strategy, making it easier for staff to expand on good practices they were already using. While Kossyvaki *et al*.'s earlier implementation of AISI (2012) suggested that one of the strengths of the intervention is that it encourages staff to build on good practice, without requiring costly special equipment or lengthy training, this research adds to the evidence base for this assumption. In addition, it provided evidence for the concept that presenting AISI to staff as an intervention that will enhance their existing good practice will also likely enhance their confidence in employing it including those principles that are not in their current repertoire.

Table 10: Mean staff use of AISI principles and communicative opportunities, pre- and post-intervention across all activities (N=5)

AISI Principles	Pre Mean	Pre SD	Post Mean	Post SD	Change Score[1]	Cohen's *d* Effect Size	Effect Size Interpretation[2]
1. Respond to all communicative	6.20	2.77	12.4	1.67	6.20	2.79	Large
2. Expand on communicative attempts	11.6	5.37	21.2	1.79	9.60	2.68	Large
3. Gain child's attention	9.20	3.63	15.2	1.30	6.00	2.43	Large
4. Wait for initiations	9.40	4.72	17.2	1.92	7.80	2.35	Large
5. Use minimal speech	9.80	4.15	16.0	1.41	6.20	2.23	Large
6. Provide time to process information	6.20	4.15	12.4	2.07	6.20	1.99	Large
7. Establish appropriate	4.00	2.00	6.40	0.89	2.40	1.66	Large
8. Use exaggerated pitch, facial	3.60	2.61	10.0	5.61	6.40	1.56	Large
9. Show availability	5.20	3.56	9.40	2.30	4.20	1.43	Large
10. Imitate the child	1.00	1.73	3.80	2.86	2.80	1.22	Large
11. Use non-verbal cues	7.20	4.82	13.8	6.06	6.60	1.21	Large
12. Follow child's lead/focus of attention	1.20	2.17	2.60	1.34	1.40	0.80	Large
13. Assign meaning to random actions or	1.40	1.67	2.40	2.30	1.00	0.50	Medium
Communicative Opportunities							
1. Contradict expectations	0.00	0.00	0.00	0.00	0.00	n/a	n/a
2. Give non-preferred items	0.00	0.00	2.60	1.95	2.60	2.67	Large
3. Give small portions	2.20	2.49	8.40	2.79	6.20	2.35	Large
4. Stop part-way	1.00	1.22	2.80	1.10	1.80	1.55	Large
5. Give material the child will need help with	1.00	1.00	3.60	2.51	2.60	1.48	Large
6. Make items inaccessible	4.00	3.00	7.40	1.82	3.40	1.41	Large
7. Offer choice	1.60	2.07	3.20	2.77	1.60	0.66	Medium
8. Forget something vital	0.40	0.89	0.60	0.55	0.20	0.28	Small
9. Withdraw attention	1.40	1.3	0.8	1.3	0.60	0.45	Small

[1] Change score is post-mean–pre-mean. [2] Cohen's *d* effect size interpretation: 0.2 small, 0.5 medium, 0.8 large effect size.

As *Table 10* shows, comparison of pre-and post-intervention video data revealed that use of twelve of the thirteen general principles increased markedly, as evidenced by a large Cohen's *d* effect size. This indicates that there was a significant improvement in the frequency with which staff implemented the vast majority of principles used with each

child for all activities. All staff changed their interactive style to a great extent. However, there were differences between staff, and there was less improvement overall in staff assigning meaning to random actions or sounds made by the child, which achieved a medium-effect size.

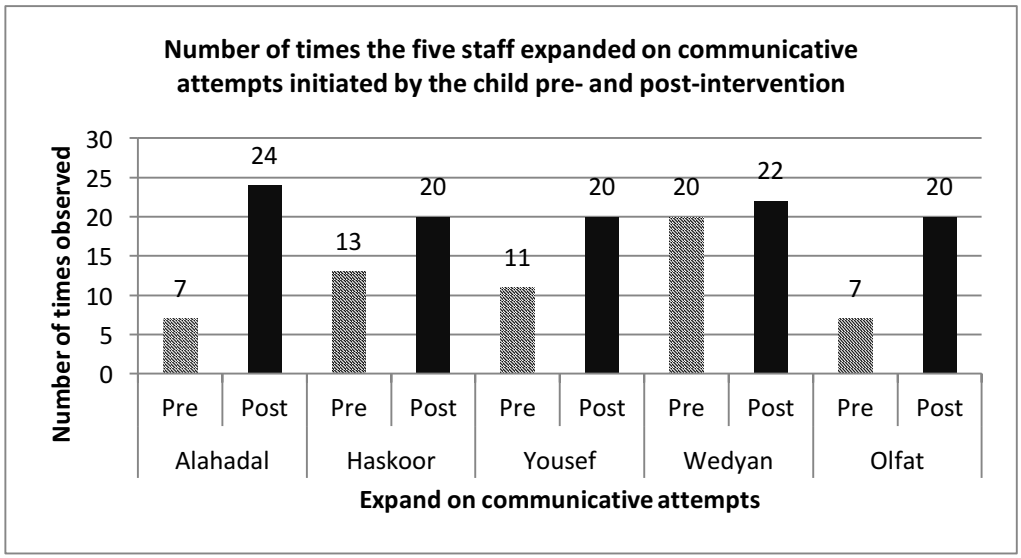
In addition, five of the nine relevant communicative opportunities were used more frequently post-intervention, including giving non-preferred items, giving smaller portions, giving material the child needs help with, stopping part-way, and making items inaccessible, resulting in a large Cohen's *d* effect size. However, the staff appeared to avoid the opportunity of forgetting something vital, perhaps because they were afraid of upsetting the child, or perhaps because they simply forgot to create this situation. Moreover, the staff withdrew attention from the child less frequently post-intervention, and none of the five staff were observed to contradict the child's expectations, pre- or post-intervention.

5.3 Implementation of AISI principles across all five staff members

In this section the video data is analysed to determine the number of times each of the five staff members used the AISI principles pre- and post-intervention, across all three activities, to determine the extent to which they successfully implemented the intervention. These results are reported below for each AISI principle, across all five members of staff, and with reference to data collected using the staff evaluation checklist and field notes from observations and post-practice discussions with staff.

5.3.1 Expand on communicative attempts

Figure 3: Number of times the five staff expanded on all communicative attempts pre- and post-intervention, across all three activities



The principle of expanding on the child's communicative attempts was coded for in situations where *"adults' utterance was the length of child's utterance plus one"* (adapted by Kossyvaki, 2014, from Rogers and Dawson, 2010). In other words, if the child did not communicate verbally, the adult would use single words. Once the child used some words, the adult would use phrases of two or three words, based on the initiations given by the child.

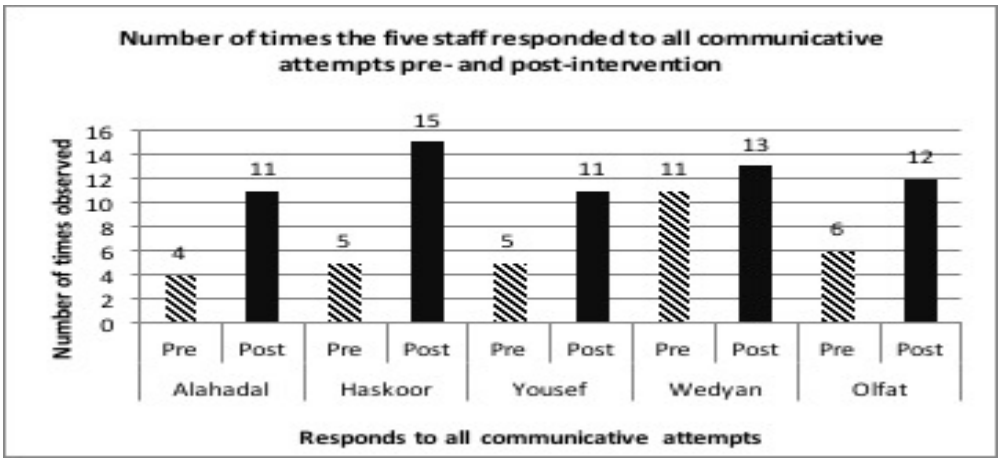
The footage showed all staff's use of this principle pre-intervention and increased post-intervention. The frequency of expanding on communication attempts doubled for four teachers. However, Wedyan only slightly increased her use of this tactic, because she already used it frequently pre-intervention: she would expand the words used with her

child most of the time. For example, when the child asked *"juice?"* she expanded on it straightaway to *say "want juice?"* or *"Albeshri's juice!"* The child appeared to expect the adult to build on this communication. She also stated that she felt very confident using this strategy, and would highly recommend it, especially for a child who had limited words. Another example was provided by Alahdal, when a child showed him a picture to indicate that he wanted something, Alahdal would use one word that matched the picture to expand the communication.

The staff evaluation checklist showed that all the staff used this principle many times per day. In the discussion sessions immediately after implementation, staff agreed that it is easy to understand and implement. Haskoor also stated that this principle improves the child's capability and level of communication naturally: with non-verbal children it was easy for staff to link the pictures or symbols the children use to communicate with one or two relevant words. With children who are beginning to use verbal speech, it provided a simple way to build on what the children are already doing without introducing confusion by using too many words.

5.3.2 Respond to all communicative attempts

Figure 4: Number of times the five staff responded to all communicative attempts pre- and post-intervention, across all three activities



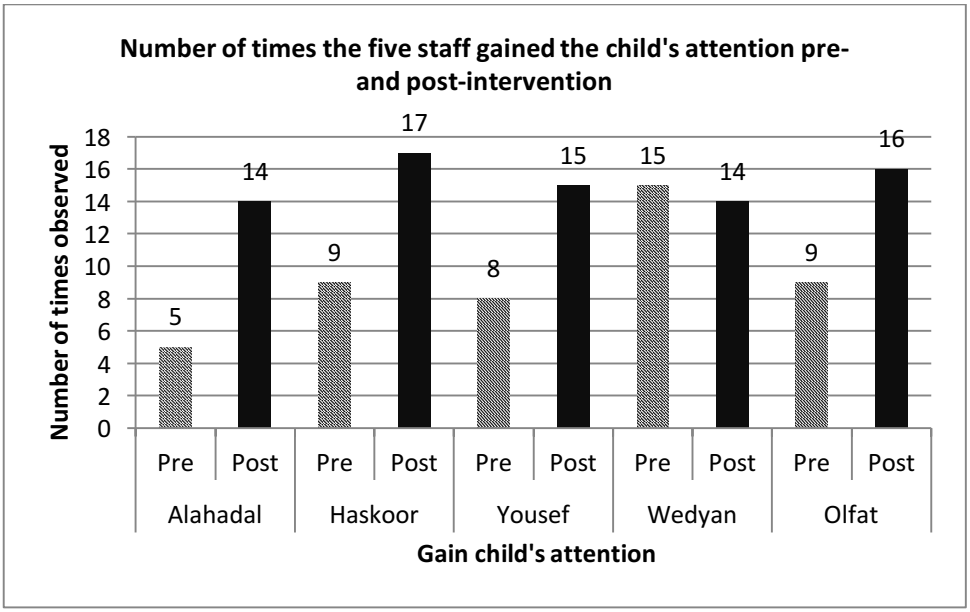
This principle was coded for when the video footage contained situations where *"the adult gave the object the child asked for, took away the object they protested for, allowed them to start and terminate activities when they communicated these. In cases where the child could not finish their activity in time or have the object they wanted, the adult acknowledged the communicative attempt and indicated steps for completion of the present task"* (adapted by Kossyvaki, 2014, from Prizant *et al*., 2006).

Based on the video data, four of the staff members nearly doubled their use of this principle, and the fifth, Wedyan, slightly increased her frequency of using this principle as she was already using it pre-intervention. The staff evaluation checklist showed that all the staff responded to the child's communication attempts many times per day. In discussions with the staff taking part in the action research process, as recorded in the researcher's fieldnotes, all of the staff expressed confidence that this principle was easy to understand and implement. They found it effective and useful with the children. Haskoor stated that

"we should respond to the child in all of the child's communication, to engage, and also to make it clear to the child that we understand each other." Wedyan stated: *"sometimes the child gets frustrated and tries to communicate what it is he wants to do, but my answer is no."* In such cases staff were encouraged to give the child more flexibility through responding in a way that opened up a circle of communication with the child about what needs to happen first.

5.3.3 Gain child's attention

Figure 5: Number of times the five staff gained the child's attention pre- and post-intervention, across all three activities



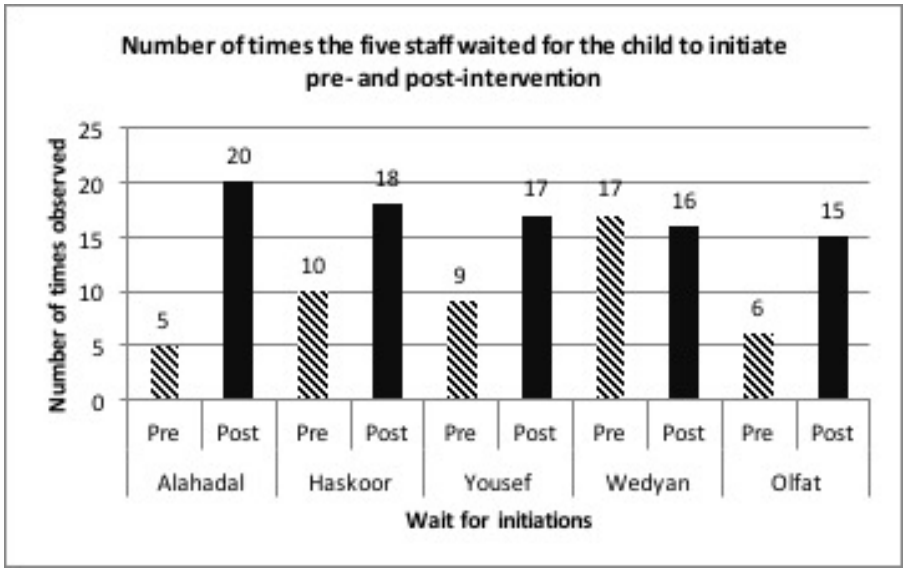
This principle was coded for when the video recording contained situations in which the adult called the child's name before addressing them; they may alternatively have said something like *"Hello"* [or in Arabic "*Salam Alikum*"] or *"good morning [name of child]"*; the adult may also sing attention-gaining songs, such as 'Sabah Alkhair,' touch him/her lightly, or/and take hold of his/her hand, and/or blow gently on his/her cheek

(adapted by Kossyvaki, 2014, from Prizant *et al*., 2006). The video footage clearly shows that the use of this principle increased post-intervention, more than doubling for all staff except Wedyan, whose use of it slightly reduced (see *Figure 5*). Overall, the staff were able to gain the child's attention pre- and post-intervention, and this increased post-intervention.

The staff evaluation checklist showed that all staff gained the child's attention more than five times per day. Within the field-notes discussions, all staff stated that this principle was easy to understand and easy to implement; Wedyan said that in the post-intervention phase it did not work normally with her due to the child being upset. But she fully understood it, and was able to gain the child's attention pre- and post-intervention. During the after-work discussion sessions, all the staff stated that it is very effective, and Haskoor said that it is key to getting into the child's world and starting communication.

5.3.4 Wait for initiation

Figure 6: Number of times the five staff waited for initiations pre- and post-intervention, across all three activities



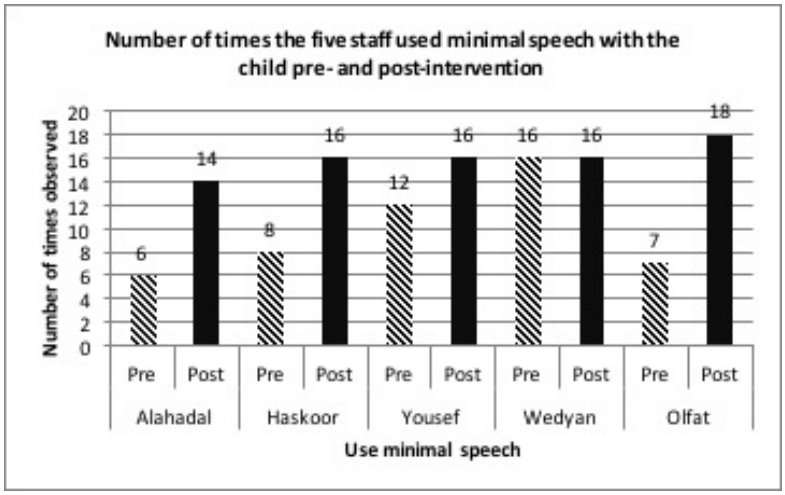
This principle was coded for in situations where *"the adult set up the situation for interaction and waited for at least five seconds for the child to initiate"* (adapted by Kossyvaki, 2014, from Prizant *et al*., 2006). Alahadal was the one staff member to exhibit the most considerable increase in the frequency of using this principle post-intervention. Most of the teachers used this principle about twice as often post-intervention, although in the case of Wedyan, the frequency of both pre- and post-intervention use of waiting were similar. She used it frequently pre-intervention, and decreased very slightly afterwards because her child was a bit anxious and nervous. Although Wedyan differed from some other staff generally as she had used more of the AISI principles more often before the intervention, in field notes discussions she clearly stated that she appreciated the encouragement she received to improve on her experience with knowledge. The AISI

intervention provided her with more information about why it was important to use the principles, and may have improved her skill in using them.

The staff evaluation checklist found that all the staff were using this principle fairly often post-intervention. In field-notes discussions, staff said they found this principle easy to understand and to implement, and that it was useful and effective. They noted that after training on AISI, they found that waiting for the child longer reduced the need for prompts and increased the frequency of communication initiation. For example, Wedyan said: *"it is a kind of patience to wait for the child longer and give the child more opportunities to initiate."* Also, Haskoor stated that "this principle required some patience to give the child opportunity to initiate." A key finding was that sometimes adults had to wait longer than felt comfortable. However, after being introduced to AISI, all staff said they became more confident about waiting. Olfat stated that "i*t is better to give the child chance to initiate, but recognised that sometimes staff had been intervening too soon, either due to human nature or by mistake*". Yusef mentioned that "*sometimes when staff were working with great enthusiasm this had an impact on not waiting long enough to let the child communicate"*.

5.3.5 Use minimal speech

Figure 7: Number of times the five staff used minimal speech pre- and post-intervention, across all three activities



The 'use minimal speech' principle was coded for in situations where *"the adult used up to three or four relevant concrete words and mapped them exactly onto aspects of the situation in hand"* (adapted by Kossyvaki, 2014, from Potter and Whittaker, 2001). Based on the video recordings, it can be concluded that use of this principle increased to double post-intervention (see *Figure 7*). Yousef and Wedyan used this principle frequently pre- and post-intervention. Olfat and Alahadal improved their use of minimal speech, having recognised during the AISI staff training that staff in Saudi Arabia often use excessive speech when working with children, and that this can sometimes confuse the child. This principle had been presented to staff during in-service training before, but the AISI training helped some staff accept and understand it on a higher level.

In the staff evaluation checklist data, all staff are recorded as having used this principle many times per day. Also, in the individual discussions after work, they stated that it is

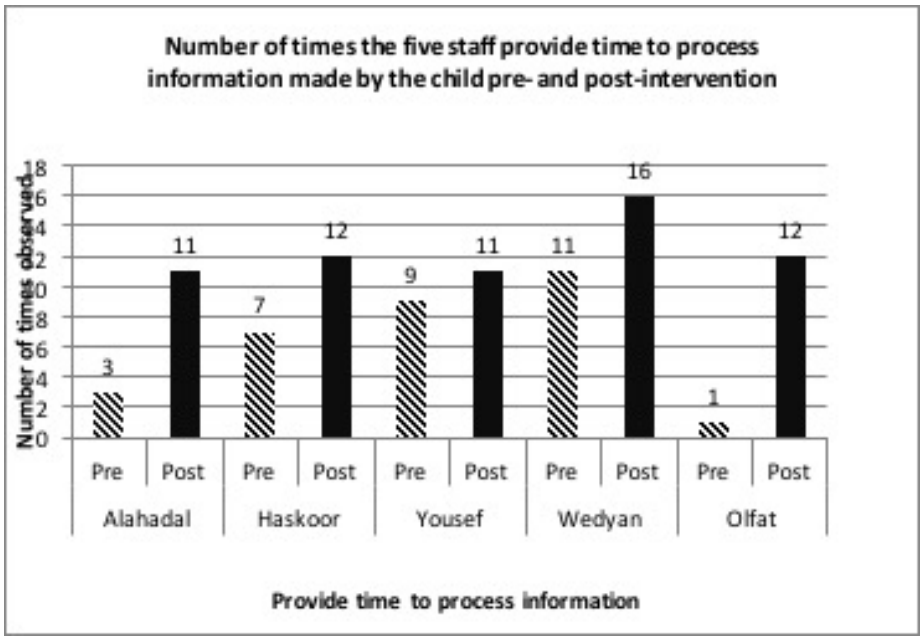
easy to understand and easy to implement, and that they also could see the benefits straightaway when it was used. All staff found it very effective as well, despite the fact that most had used excessive speech before the intervention, and they had occasional difficulties with reducing their speech. Yousef said that:

> *"We have to force ourselves to use one or two relevant words so the child can recognise the Middle Eastern language; we speak too much with the child, as we think we need to for the child to understand or thought the child may understand, but in fact the child may be confused when they cannot recognise all of what we say."*

Wedyan noted that *"minimal"* may mean different things to different people, so clear guidance is needed: *"it might be culture or personality, because some people's 'minimal speech' isn't what we would consider minimal speech,"* she said.

5.3.6 Provide time to process information

Figure 8: Number of times the five staff provide time to process information pre- and post-intervention, across all three activities

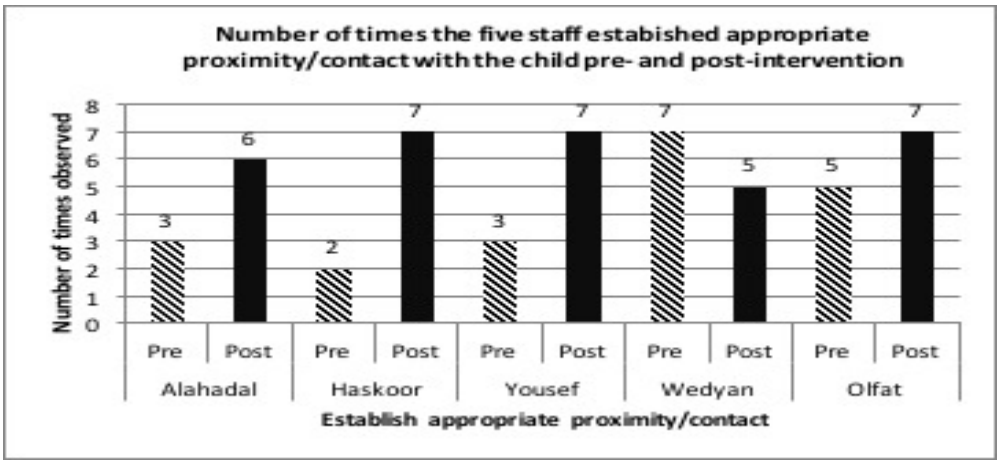


This principle was coded for when *"the adult gave the child verbal or non-verbal information and provided them with at least five seconds to process the given information"* (adapted by Kossyvaki, 2014, from Nind and Powell, 2000). The video footage showed that this principle was used fairly often pre-intervention by three staff members, and occasionally by the other two. However, the frequency of use increased post-intervention. Olfat's use significantly increased, from once pre-intervention to twelve times post-intervention. Wedyan applied this principle very well before the research phase, but improved her use further.

The evaluation checklist showed that all the staff members used this principle many times per day, and that they came to expect a delay in response from the child. As Haskoor stated, *"it is very beneficial and very effective as it helps to increase spontaneous communication with a child with limited ability to communicate."* During the individual after-work discussions with staff, they stated that while this principle is easy to understand and easy to implement, they nonetheless found it difficult. They had long been in the habit of prompting the child quickly, and were not used to waiting long before repeating the prompt, thereby intervening too soon. Staff were able to see results, however, which encouraged them to use it more often. For example, Yousef stated that he saw that Balbaid benefited from this principle, as the child was very quiet and needed some time to process information.

5.3.7 Establish appropriate proximity/contact

Figure 9: Number of times the five staff established appropriate proximity/contact pre- and post-intervention, across all three activities.

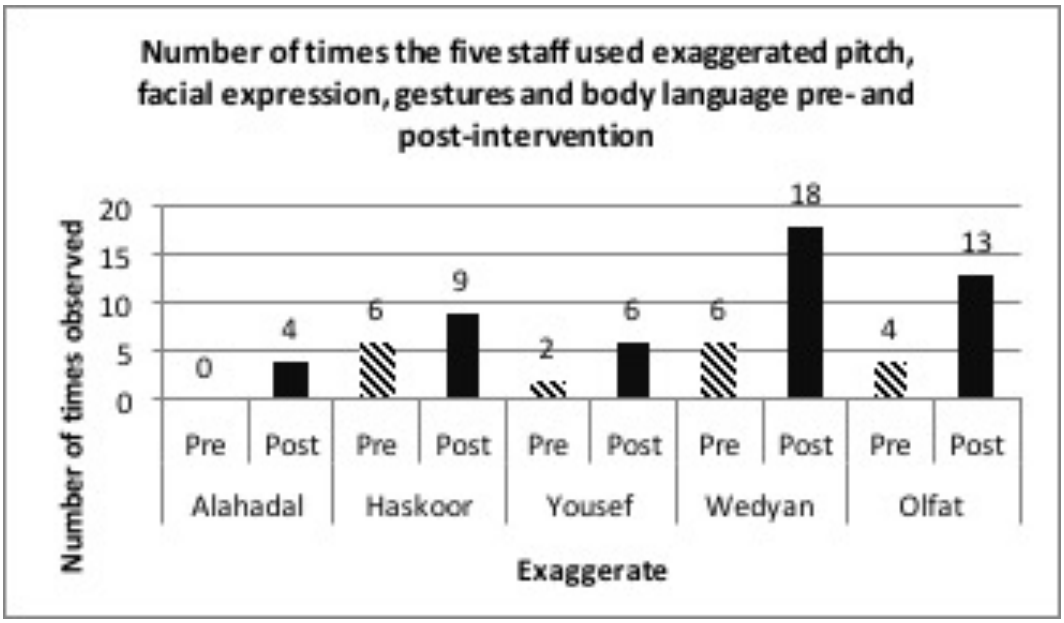


When *"the adult approached the child to a distance of less than 1 metre and might have touched them too*" (adapted by Kossyvaki, 2014, from Nind and Hewett, 2001), this was coded as establishing appropriate proximity/contact. The video footage revealed that use of this principle intensified post-intervention in the case of each staff member (see *Figure 9*). In fact, the frequency of its use post-intervention nearly doubled. Haskoor, the member of staff who used this principle the least pre-intervention, used it the most frequently post-intervention. However, one teacher, Wedyan, showed less use post-intervention than pre-intervention. During the field notes discussions, Wedyan stated it was used less with the child in the post-intervention phase as the child was upset during that period, and was not as comfortable with adults in close proximity to him during that time. She also raised the issue of hypersensitivities some autistic children experience, which can vary in intensity due to outside factors.

The staff evaluation checklist used by the researcher showed that most of the staff used this principle on average more than five times per day. The field notes indicate that the staff found this principle easy to understand, and other than as noted previously, they used it often. All of the staff were familiar with this principle from ABA approaches and, while they had not found it hard to use previously, their usage increased after the intervention.

5.3.8 Exaggerate pitch, facial expression, gestures and body language

Figure 10: Number of times the five staff used exaggerated pitch, facial expressions, gestures and body language pre- and post-intervention, across three activities



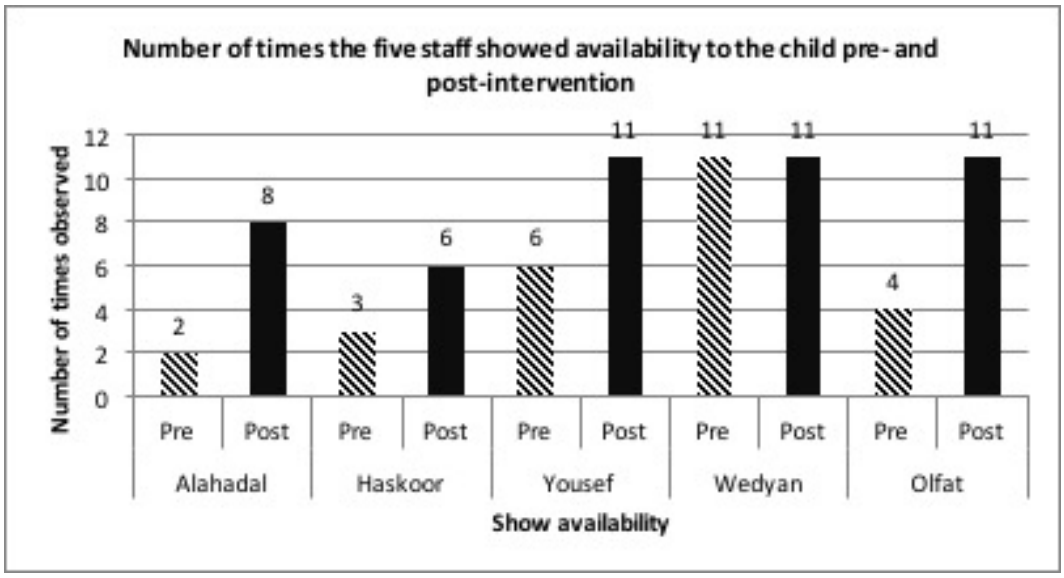
Recording this principle required situations *"when staff used more animated pitch or more lively facial expressions, gestures or body language than usual"* (adapted by Kossyvaki, 2014, from Kaufman, 1994 and Greenspan and Wieder, 1998). All the staff members showed an increase in the use of this principle in the video recordings (see *Figure 10*). In the case of Wedyan and Olfat, the frequency of use considerably increased post-

intervention. With the two females there was a more significant increase in animation compared to the three males, suggesting a higher level of interactivity between female staff and children. However, Olfat noted that the child she worked with, Ali, could easily become overwhelmed when she used exaggerated pitch.

The staff evaluation checklist showed that three staff, including the two females, used this principle many times per day, while Haskoor and Alahadal used it a few times per day, depending on the day and the child's situation. During the action research filed-notes discussions, Wedyan stated: *"I have used exaggeration many times to try to engage and interact with child while he was upset."* Alahdal, on the other hand, stated that he needed to be in a good mood to use this principle, and based on his personality he found a bit hard to implement. Yousef also said it is easy to understand and easy to implement, *"but only as long as nobody is watching you."* These differences could be based on personality types, as Yousef indicated, but the discrepancy between females and males suggests that standards for behaviour and communication style for men and women, either generally or in Saudi Arabian culture specifically, may also have exerted an impact.

5.3.9 Show availability

Figure 11: Number of times the five staff showed availability pre- and post-intervention, across all three activities)



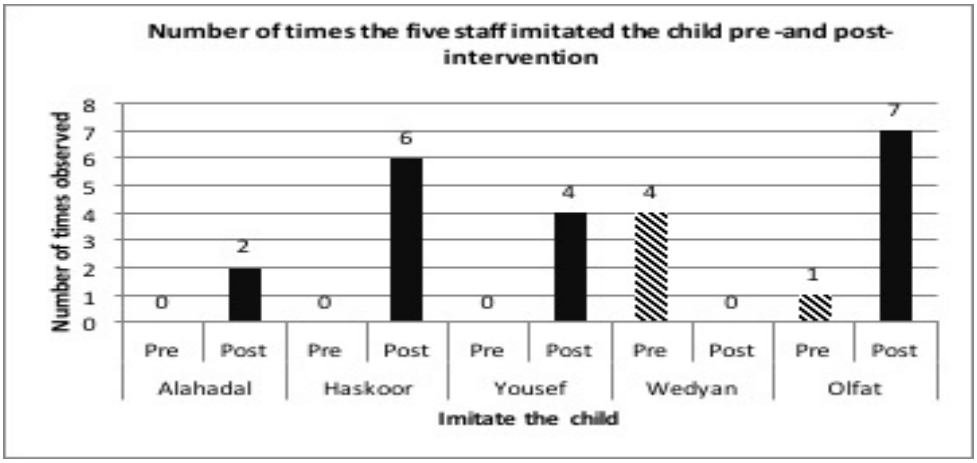
The principle of showing availability was recorded in situations where *"the adult extended their hands towards the child, having wide and questioning eyes"* (adapted by Kossyvaki, 2014, from Prizant *et al*., 2006). Again, the frequency of this principle's use more than doubled post-intervention in the case of some staff members (see *Figure 11*). In the case of Wedyan, the use of this principle was already high pre-intervention and remained at the same level post-intervention.

The staff evaluation checklist reflected what most staff said during the field notes discussions that they used the principle of showing availability fairly often, on average more than five times per day. They found this principle easy to understand and easy to implement as well. They acknowledged that this principle reduced the child's need for prompts and increased the child's initiation of communication, and also increased eye

contact by the child. All the staff stated that they highly recommend this principle when interacting with the child. Olfat acknowledged that "*It's quite a good way of reducing children's prompt dependence if you take your hand away but you leave it in sight*."

5.3.10 Imitate the child

Figure 12: Number of times the five staff imitated the child pre- and post-intervention, across all three activities



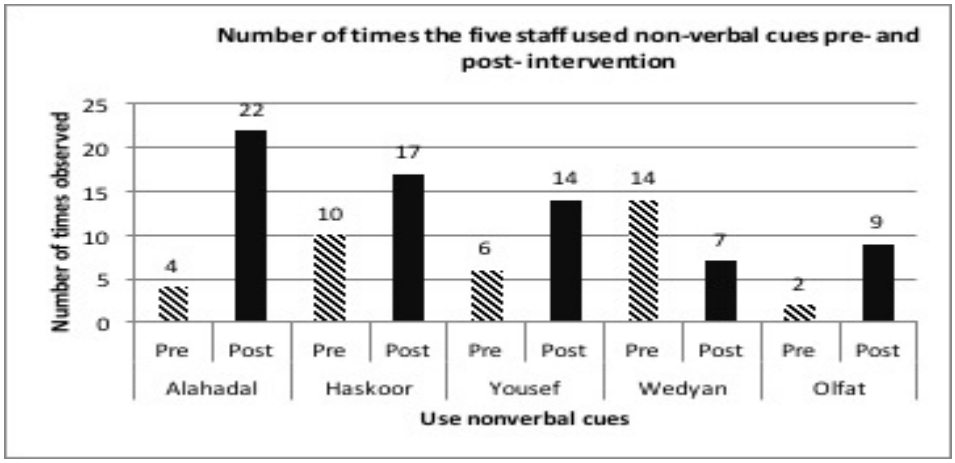
By definition, imitation is a situation where *"the adult imitates the child's verbal (e.g. vocalisations, words) or non-verbal (e.g. actions) behaviour"* (adapted by Kossyvaki, 2014, from Prizant *et al*., 2006). The video footage revealed that the number of times the children were imitated by the staff members increased post-intervention (see *Figure 12*), except in the case of Wedyan, due to the situation of the child being upset because of a medication change. Pre-intervention, Alahadal, Haskoor and Yousef did not use this principle at all. However, they used it the more frequently in the post-intervention phase; while Olfat and Haskoor showed the greatest increase in its use.

The staff evaluation checklist also showed that the staff used this principle a few times per day, depending on the situation. During the action research discussions, all of the staff individually agreed that imitation is effective, easy to understand and easy to implement, but its use depends on the situation and personality of the teacher and the child. After the training they had considerable recognition of how to mirror the child effectively. Olfat said that *"I found it very effective, and the child interacted quite often and was happy when I imitated him."* After the training, she recognised that, based on research, imitation helps the child to increase their communication rather than to improve their negative behaviour and she made another interesting point during the field notes discussion during the intervention, saying that she believed her child increased his eye contact when being imitated.

Haskoor was also highly impressed by the use of imitation and how it affected the nature of playing with a child whilst assisting in improving the interaction between the child and adults. However, he also said that he felt slightly uncomfortable using it, because he knew the aim of the study and so was self-conscious about being recorded while imitating the child.

5.3.11 Use nonverbal cues

Figure 13: Number of times the five staff used non-verbal cues pre- and post-intervention, across all three activities



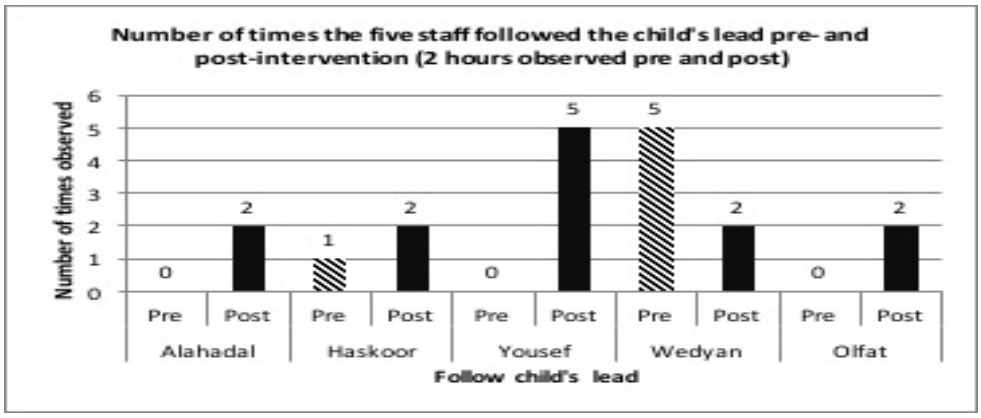
Coding for this principle required situations where *"the adults used symbols or pictures, objects of reference, gestures, body language, physical prompts or Makaton signs"* (adapted by Kossyvaki, 2014, from Prizant *et al*., 2006). The analysis of the video footage indicated that this principle was more frequently used post-intervention by all staff except Wedyan (see *Figure 13*). Alahadal's use increased particularly significantly.

The staff evaluation checklist also showed that all the staff used non-verbal cues many times per day, except Wedyan, who decreased this principle from 14 times to seven times. During the field notes discussions, all of the staff agreed that this principle is easy to understand and easy to implement, and they also found it useful and beneficial. Alahadal stated during the discussion that *"he found non-verbal cues gave the child and staff more opportunities to communicate without the need for any resources, and that it supported childrens' understanding effectively."* For example, if his child wanted to finish his work before it was time and was standing up to go, Alahadal could show him his timetable and

also use his hand to show the child that he is not finished and should return to work. However, Wedyan stated that she found it difficult to use with her child in the post-intervention phase - she needed to focus on simply managing his behaviour and helping to settle the child in the class. She also stated that *"it depends on having a personality that can support this principle."* The staff agreed that using non-verbal cues alongside minimal speech were the two easiest to understand and implement principles as they were already core elements in their practice. However, they acknowledged that AISI reminded them of their importance and gave them ideas for further practice.

5.3.12 Follow child's lead

Figure 14: Number of times the five staff followed the child's lead pre- and post-intervention, across all three activities

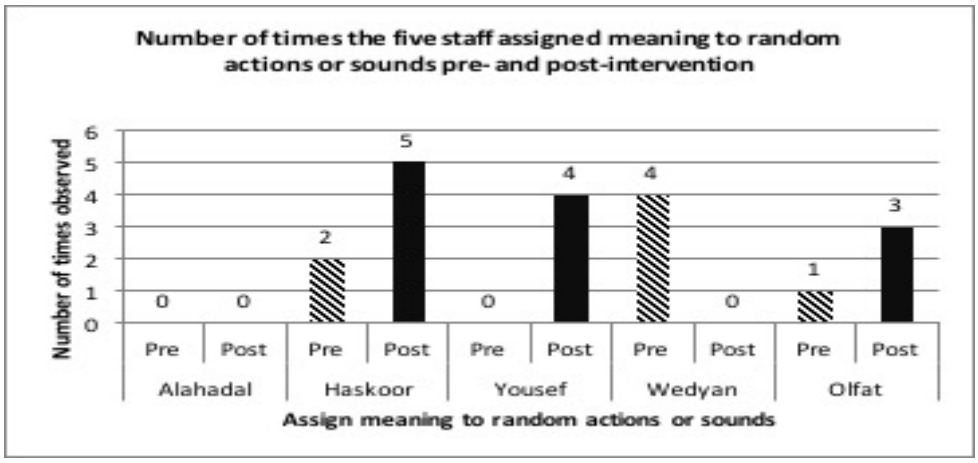


For the purpose of recording this principle, the observed situations were those in which *"the adult followed what the child was doing or commented on it"* (adapted by Kossyvaki, 2014 from Prizant *et al*., 2006). The footage showed a considerable increase in the use of this principle post-intervention in the case of Yousef, a slight increase by three other staff members, and a decrease in the case of Wedyan (see *Figure 14*). For example, in the video recording Yousef can be seen to ask the child during the unstructured free play activity *"what will we play now?"* and *"what will Balbaid play now?"*

The staff evaluation checklist showed that four were following the child's focus of attention a few times per day post-intervention, while Yousef was doing this many times. However, in the post-intervention phase, Wedyan used it least due to the upset child. During the field notes discussions during the intervention with staff, they stated that the principle is easy to understand and difficult to implement. Alahadal and Olfat stated that this principle's usefulness is based on the situation of the child; it appears to be fairly effective, but it requires practice and the availability of appropriate situations. Despite acknowledging its effectiveness, the teachers did not implement the principle of following the child's lead and focus of attention frequently, except for Yousef who considerably increased from zero to five. Some staff did not use it at all pre-intervention; it might be the teachers felt confused because this principle conflicts with adult-led interventions such as ABA.

5.3.13 Assign meaning to random actions or sounds

Figure 15: Number of times the five staff assigned meaning pre- and post-intervention, across all three activities



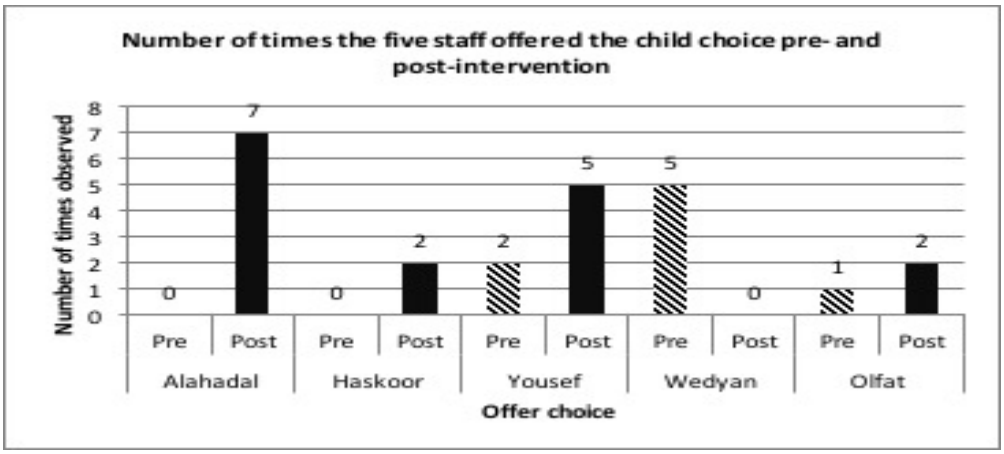
As for this principle, it was recorded in situations when "*the adult reacted as if the child's behaviour was communicative, even when it was not"* (adapted by Kossyvaki, 2014, from Christie *et al*., 2009). Based on analysis of the video footage, it can be concluded that the use of this principle increased post-intervention in the case of most staff members, although Alahadal did not use it in either pre- or post-intervention (see *Figure 15*). The most frequent user, both pre- and post-intervention, was Haskoor, followed by Yousef, and then Olfat. Wedyan used it in a good way pre-intervention, but did not use it in the post-implementation phase as the child she was working with was upset.

The evaluation checklist showed that the staff used this principle few times. While they found it easy to understand, they also found it difficult to implement, and they did not feel confident about implementing it. During field notes discussions, they mentioned that more creativity and experience were needed to make good use of this principle. Alahadal said that *"it depends on the situation, but with respect it is quite difficult,"* and added that he is not sure about its effectiveness. Haskoor stated that some of the interventions or strategies, especially this one, are easy to understand in theory but difficult to implement. Staff expressed concerns about the effectiveness of assigning meaning to the child's random actions and sounds. They also found this principle of limited implementation, best used in non-classroom activities.

5.4 Use of communicative opportunities across all five staff

In this section results are presented regarding the use of nine communication opportunities, based on the video recordings of staff practice before and after the AISI intervention.

Figure 16: Number of times the five staff offered the child choice pre- and post-intervention, across all three activities



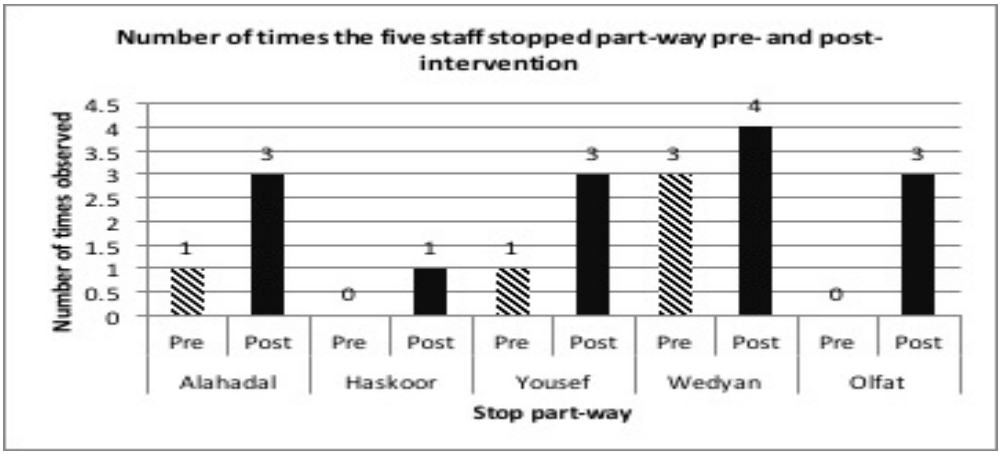
Coding for 'offer choices' was done in situations where *"the adult gave a choice of activity or food without any verbal prompt; the adult might have held out two objects for the child to choose or provided the child with a photo choice board"* (adapted by Kossyvaki, 2014, from Potter and Whitaker, 2001 and Prizant *et al*., 2006). Analysis of the video footage indicated a significant increase in use in the case of offering choices. As some of the staff had not done this pre-intervention, they then recognised that they should be offering the child choice as a way to instigate communication. They used this tactic during one-to-one and breakfast time, offering the child the choice of which juice they would like, and so on. Wedyan used offering choice a fair amount in pre-intervention stage, but the frequency decreased due to the child's situation. Three staff members offered no choices pre-intervention. Moreover, one staff member, Alahadal, had not used

it at all pre-intervention, and then used it a considerable amount post-intervention (see *Figure 16*).

The staff evaluation checklist also showed that four members of staff offered choices fewer than five times per day, while Alahadal used it more than five times per day. During the action research filed-notes discussions with staff, they agreed that offering choices is easy to understand and easy to implement, but it depended on how the situation could be set up and on the activities. Haskoor stated that they *"were able to offer choices all the time, but most of the time we forget to offer choices. We tried to shift from prompting the child (forcing him) to offering him choices."* Olfat also raised the issue of often forgetting to offer the child choices, although she now could see that it worked well to increase the child's communication took little effort to implement.

5.4.1 Stop part-way

Figure 17: Number of times the five staff stopped part-way pre- and post-intervention, across all three activities

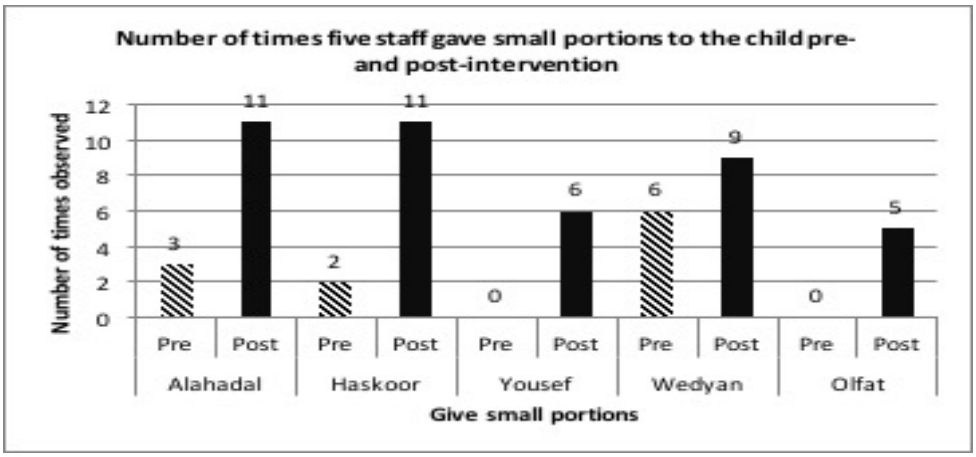


As for this communication opportunity, it was recorded in situations where *"the adult stopped part-way through a child's favourite activity, usually when it was in its peak"* (adapted by Kossyvaki, 2014, from Potter and Whittaker, 2001). Pre-intervention, only five instances (one by Alahadal, one by Yousef and three by Wedyan) of staff using this principle were recorded. Post-intervention, the frequency recorded on the videotapes increased in all cases. The footage included all of the staff members playing games and singing songs with the children, making intentional pauses in order to motivate the children to request further play.

The staff evaluation checklist showed that post-intervention all staff used stopping part-way a few times per day. All members of the action research group agreed during discussions that it is easy to understand—but could be quite difficult to implement. However, they recognised how important this principle is to encourage the child to initiate communication.

5.4.2 Give small portions

Figure 18: Number of times the five staff gave small portions to the child pre- and post-intervention, across all three activities

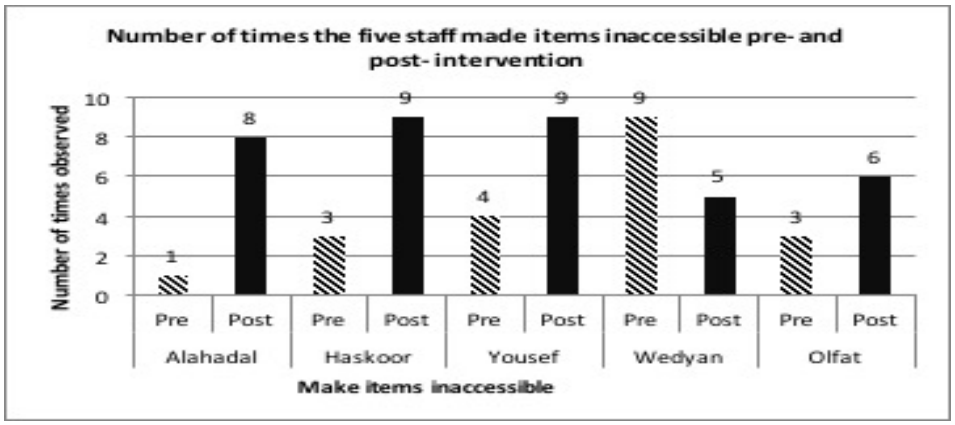


For the purpose of coding, the observed situations were those in which "*the adult gave the child small portions of food or drink so that the child could ask for more"* (adapted by Kossyvaki, 2014, from Potter and Whitaker, 2001). The pre-intervention footage only seldom contained use of this communication opportunity. The three members of staff who used it pre-intervention were Alahadal (three times) Haskoor (twice) and Wedyan (six), but it was used by all of the staff and the frequency significantly increased post-intervention.

The staff evaluation checklist also showed that staff used giving small portions many times per day, especially during the breakfast activity. They considerably increased their use of this concept, as before the intervention they usually put the whole portion of food in front of the child, which does not make the child ask for more. They found it easy to understand and easy to implement; Alahadal stated that *"it is amazing to see the child request all the time when giving him a small portion of food."* Yousef also stated that "*I found it effective and beneficial to give the opportunity to initiate a spontaneous request for more.*" Giving a small portion to the child presents a very interesting communicative opportunity because it offers a tangible reward for the child in the form of food and drink. However, using this opportunity required staff to change their usual workplace behaviour. In Saudi Arabia it is typical for staff to serve children their whole meal, then to have their own meal or a quick chat with colleagues while the children are eating.

5.4.3 Make item inaccessible

Figure 19: Number of times the five staff made items inaccessible pre- and post-intervention, across all three activities



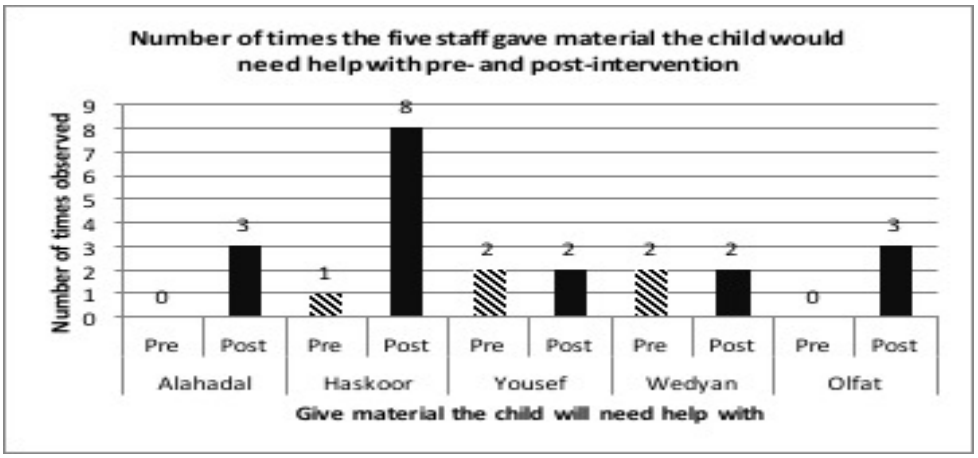
By definition, making items inaccessible is a situation where *"adults put items in sight but out of reach so that the child needed to ask for them"* (adapted by Kossyvaki, 2014, from Potter and Whitaker, 2001). The staff used this principle a few times pre-intervention but the frequency significantly increased post-intervention. For example, staff can be seen in the videotape putting children's favourite toys on the top of the cupboard and staying in front of it, providing an opportunity for the children to ask them to bring the toys down.

The staff evaluation checklist showed that all the staff used this principle many times, except for Wedyan, who only used it a few times. All staff agreed that it is easy to understand and easy to implement, but sometimes, as Olfat stated during one action research filed-notes discussion, the child got confused and upset when items were made inaccessible. *"I think that the children I am working with would just get extremely angry or lose interest,"* she said. Also, staff commented that it represented quite a shift in expected behaviour, not only of the staff but for the child as well, to all of a sudden be encouraged to request items are usually within the child's reach. This may even raise a

safety issue, in that staff usually only put items out of reach that are dangerous for children. If children get the idea that some items out of reach are OK for them to use, they might try to reach the objects without requesting an adult for them, which could result in a fall or pulling over the cupboard. Staff will therefore need to think carefully about safe ways to use this opportunity.

5.4.4 Give material the child needs help with

Figure 20: Number of times the five staff gave material the child would need help with pre- and post-intervention, across all three activities



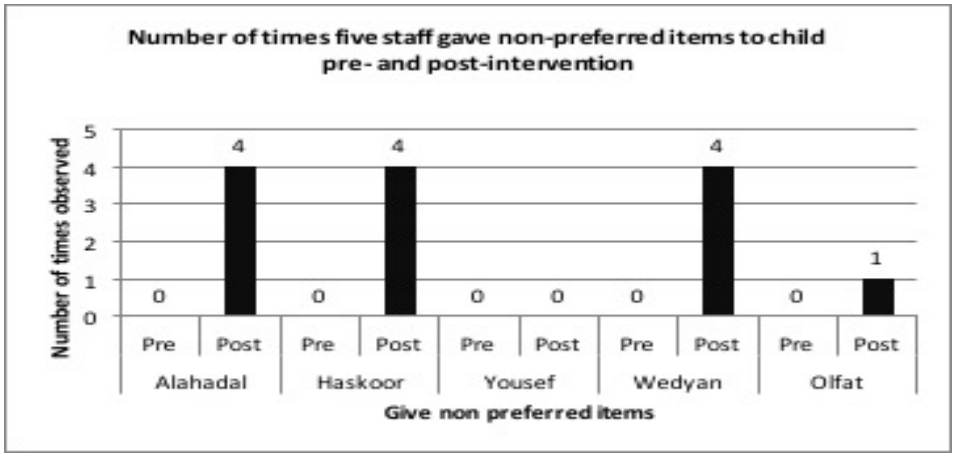
This communication opportunity was coded for when the video recordings showed situations where *"the adult gave the child materials they could not make work without the adult's help"* (adapted by Kossyvaki, 2014, from Potter and Whitaker, 2001). All of the staff members used this principle seldom pre- or post-intervention except for Haskoor, whose use significantly increased. Yusef and Wedyan used it equally both pre- and post-intervention, and Alhadal and Olfat began using it occasionally post-intervention. For example, many times during 1 : 1 work time, staff did not open the lid of the workbox

until the child asked them to. Another member of staff was seen on videotape to give a child a box of chocolate with the lid closed, and let the child ask them for help to open it. Staff would also give children a bottle of water that is not easy for the child to open, and wait for the child to ask for help.

The staff evaluation checklist also showed that the staff used this only a few times per day, except for Haskoor, who several times tried to create a situation that put an obstacle in the child's way to see what he would do. During the action research filed-notes discussions, all staff agreed that this communication opportunity is easy to understand but quite difficult to implement. Olfat stated that *"most of time she forgot to put the child in a situation: for example, when the child asked for water, she straightaway opened the bottle, and then she recognised that should not have done so."* She said that the problem *"is forgetting, and we need to familiarise ourselves to do it."*

5.4.5 Give non-preferred items

Figure 21: Number of times the five staff gave non-preferred items pre- and post-intervention, across all three activities



This communication opportunity was coded for in situations where "*adults gave the child items they were not interested in to elicit protest or comment"* (adapted by Kossyvaki, 2014, from Potter and Whitaker, 2001), such as the adult giving a child a toy he did not want or a juice he disliked. It is necessary to emphasise that this principle can only be used if the child did not ask for a particular thing beforehand, as there is otherwise the risk of confusing the child. None of the teachers used this pre-intervention; post-intervention use was strongly increased by Alahadal, Haskoor and Wedyan. Yousef continued to not use this opportunity, and Olfat showed only a small gain.

The staff evaluation checklist also showed that the few staff used this communication opportunity a few times per day, and all of them agreed that while it is easy to understand, it is difficult to implement. Also, they stated that it is likely that a child may get upset and become confused. For example, during field notes discussion with staff, Yousef raised the issue that the child might also become angry or anxious at this unexpected adult behaviour.

5.4.6 Contradict expectations

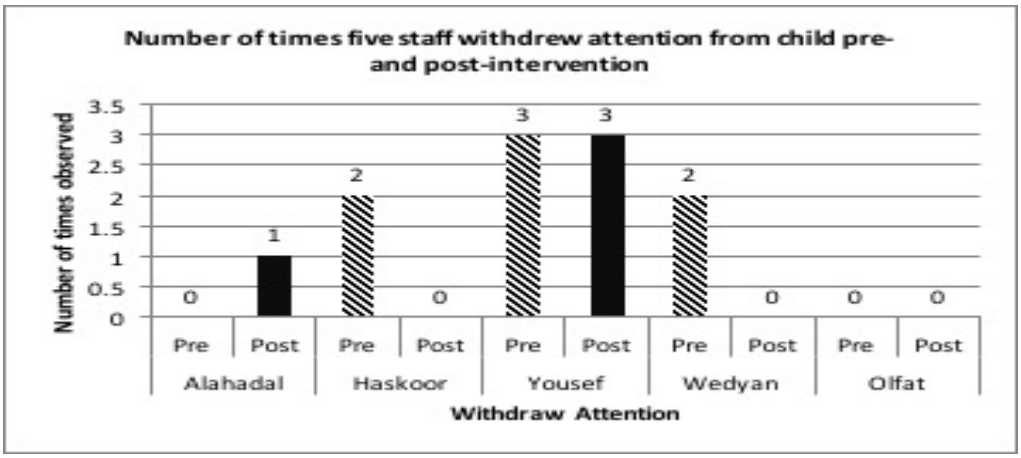
The communication opportunity of contradicting the children's expectations was to be coded for in situations where "*the adult did something out of routine or unexpected*" (adapted by Kossyvaki, 2014, from Potter and Whitaker, 2001; Griffin and Sandler, 2010). However, none of the staff members were observed using this principle in either phase. The staff evaluation checklist also showed that staff never used it.

In the field notes discussions, all of them said it is quite difficult to implement, depending on the situation, and they felt that the child could get confused or might imitate the adult (although since the purpose was to initiate communication attempts, that should not necessarily be seen as a problem). Staff said they doubted that this principle would be easy

to implement with children of this age and with their level of communication skills, and consequently doubted its efficacy, even though they had been given training during the pre-intervention phase. Indeed, they stated that it was the most difficult of the AISI principles to implement. Some of the examples presented to the staff during their training were to turn a toy animal over to see whether the child would restore it to the original position, or to give the child an animal book upside down and turn the pages backward to see what the child will then do. Staff resistance to using this communication opportunity indicates that maybe they need to see it in action before they will try it.

5.4.7 Withdraw attention

Figure 22: Number of times the five staff withheld attention from the child pre- and post-intervention, across all three activities



This communication opportunity was coded for when the video footage showed a situation where the 'adult gradually stops to make the child to ask for more.' It was a principle not used in previous AISI research (e.g. Kossyvaki *et al*., 2012), but has been suggested by other research (e.g, Furby and Catlow, 2016). It should not be confused with the use of

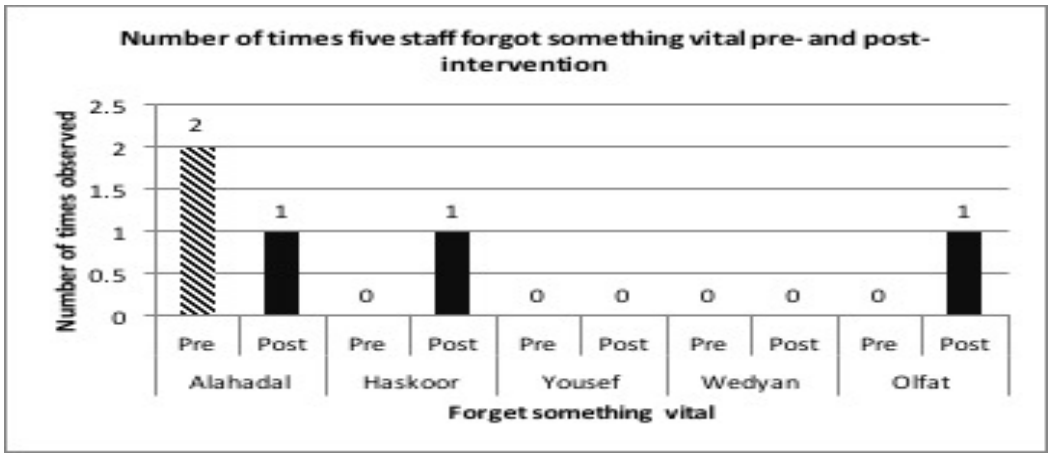
withdrawal of attention used as part of *"extinction"* procedures in ABA, where staff are instructed to withdraw attention and materials from a child who exhibits an unwanted behaviour (Janney *et al*., 2012). It is intended for use in situations where the adult and child are actively interacting.

Most of the staff members used this principle seldom both pre- and post-intervention. However, Haskoor and Wedyan stopped using it entirely post-intervention. Olfat did not use it at all.

The staff evaluation checklist also showed that few staff used it, and then only a few times per day. When asked why during the field notes discussions, most staff said that it is quite difficult to understand and difficult to implement, and that it required more creativity to withdraw from the child in a productive way. Olfat stated during the discussion that she found it difficult and confusing; Wedyan's child was having a difficult time in general. It is also possible that some staff may have had a different definition of 'withdraw attention,' so improved explanation of this communication opportunity and seeing it used might improve their willingness to try.

5.4.8 Forget something vital

Figure 23: Number of times the five staff forgot something vital pre- and post-intervention, across all three activities



This communication opportunity was coded for when the video footage contained situations in which "*the adult set up a situation where they did not do something of vital importance; this could be to give the child paper without crayons in colouring time.*" This principle was based on similar strategies suggested by other researchers. For example, Christie *et al*. (2009) had recommended that staff try giving a child juice without a straw or a portion of food without cutlery. Few staff members used this principle during the recording sessions of either phase, and the frequency of use was very low.

The staff evaluation checklist also showed that it was used only a few times, and that some staff never used it. During the action research filed-notes discussions, all of the staff members agreed that they seldom used this principle. Although they understood it and were able to implement it, they had doubts about its effectiveness. When asked why, they said that they wanted to avoid upsetting the child. Also, Olfat stated that *"she sometimes forgot to create the situation."* Wedyan maintained that the main difficulty with the children when employing this principle was that they may not be able to let the staff

know that something is missing. She claimed that "*they may get upset since something important is missing, which in the past we were bringing them the whole thing together– most likely the child will be upset and feel ignored and confused."* Also, some children might be afraid of exhibiting bad manners if they tried to eat by hand. It is only culturally appropriate to eat with the right hand in Saudi culture, and only if not offered cutlery.

5.5 Discussion

This chapter presented the most significant findings concerning staff use of the AISI principles, and suggested strategies to monitor their correct implementation. This section presents a discussion that references the literature behind each principle, comparing this particular study to other studies undertaken in this area (see *Chapter 2: Literature Review* for further discussion).

The principle of establishing appropriate proximity and contact has been developed by previous researchers and applied in UK and US educational settings. The approaches suggested by SCERTS (Prizant, 2006) and Hanen (Manolson, 1992) show that adults can achieve more direct interaction and physical proximity with a child by getting down to his/her level. According to Nind and Hewett (2001), as well as Potter and Whittaker (2001), it is advisable for the adult to position himself even below the level of the child, so that the child gains confidence and feels secure.

In the case of the child Albeshri, it was difficult to establish proximity post-intervention due to his anxious reaction, and staff proximity was reduced as a consequence. However, the principle of proximity was effective with most children, and four of the staff increased their use of this principle. The principle of proximity had a large effect size (Cohen's

d:=1.66), slightly stronger than in Kossyvaki's study (Cohen's *d*= 1.43) (Kossyvaki *et al*., 2014).

Waiting was a very effective principle for the teachers, who previously tended to prompt the child. It is advisable to refrain from intervening prematurely, instead waiting for a child's response as long as there was the possibility of one (Prizant *et al*., 2006). In Intensive Interaction, the strategy of pausing and waiting brought positive results (Nind and Powell, 2000). According to Manolson (1992), adults tend to experience nervousness when waiting, because they understand silence as a sign of inactivity, and assume that they will need to prompt the child to avoid losing his/her attention. This phenomenon was also observed in the present study. Waiting was difficult for the staff because they thought that when they were inactive, their colleagues might see them as lazy or disengaged. They were also concerned that waiting could create problems for the child, making him/her inattentive or nervous. Olfat stated that she thought *"it is a bit difficult to wait, and it might be a bad point for me as my colleague may be watching me ignore the child. However, after the explanation that there is a research base we recognised how really effective it is and how it increases the child's initiation."* This difficulty for staff with waiting is also illustrated in Gillett and LeBlanc's (2007) study.

Numerous studies have shown the positive effect of waiting on children's communication. For their study, McAteer and Wilkinson (2009) provided staff with training in a facilitative interactive style, which included periods of waiting for the child to initiate communication. The results showed that the initiation of communication by the children was more frequent post-intervention. Waiting showed a large effect size in this study (Cohen's *d*= 2.35) as the staff more frequently considered waiting for the child to initiate. This can be compared with Kossyvaki's study (*ibid*.), which also had a large effect size (Cohen's *d*= 0.92).

Making oneself available constitutes a principle of AISI with significant effectiveness, particularly due to the ease by which it can be implemented by teachers. In this regard, Nind and Hewett (1994) consider the best way to show availability to be positioning one's body towards the child with a relaxed head and shoulders, having eyes wide open whilst displaying a facial expression that indicates to the child that the teacher is interested in any interaction or communication with the child. The low-arousal approach (Woodcock and Page, 2010) includes avoiding clearly tense muscle postures, keeping the hands visible, open and relaxed, and refraining from staring but maintaining eye contact. According to Prizant *et al*. (2006), it is especially important for teachers to show availability when a child's skills are challenged by an activity. If the child does not request help voluntarily, the adult may gesture by holding their hand with the palm in a vertical position, and if the child makes no reaction within ten seconds, he/she should be encouraged to respond (Potter and Whittaker, 2001). The literature suggests that when adults show availability, children may increase their eye contact. For example, Hwang and Hughes (2000) found that when adults put on an expectant look, children with autism in their sample increased their eye contact. In the current study, eye contact increased by 6.4 (Cohen's *d* effect = 2.79, a large effect size) when adults changed their interactive style. Possibly the principle of showing availability has played a role in this increase.

Hwang and Hughes (2000) also found that adapting an available face expression resulted in an increase in children's joint attention. This was only seen in one child in this study, although the sample was similar to Hwang and Hughes's sample (i.e. non-verbal children with autism). In Kossyvaki's study, showing availability increased, with a large effect size (Cohen's *d*=0.95) and she reported it as an effective principle (Kossyvaki *et al*., 2014).

This can be compared with the increase in the current study, which also had a large effect size (Cohen's *d*= 1.43).

With regards to imitation, SCERTS (Prizant *et al*., 2006) recommended first miming the child's behaviour (both verbal and non-verbal) and then pausing, anticipating a response from the child. According to Flack *et al*. (1996), imitating helps create a turn-taking pattern, making the child understand that he/she can influence others by his behaviour. Caldwell (2006) perceives imitation as something the child can truly understand in the world, which might otherwise overload him/her with sensory stimuli. Christie *et al*. (2009) claims that a child becomes more aware of himself if he sees his actions imitated. Manolson (1992) emphasises that imitation establishes a connection with the child that can gradually become a conversation. A study by Sonders (2003) suggests that the turns of child and adult should be similar in length, so that the child does not lose interest. In case the child does not acknowledge the adult imitating him, Christie *et al*. (2009) provide some helpful ideas, such as vocalising through a cardboard or plastic tube, or using a plastic echo mike, a drum or another simple sound-maker.

However, EIBI therapists (Richman, 2001; James and Fletcher, 2011) heavily criticise movement mirroring, as they consider it to be a possible trigger for 'inappropriate' behaviour, such as flapping or getting out of their seat. This idea may be the source of hesitation shown by some Autism Centre administrators and staff members, as they have been trained to try to minimise 'autistic-looking' behaviour such as 'stimming.' Individuals who are training staff need to be respectful and recognise the reasons behind their concerns. They may be able to encourage staff to try mirroring by emphasising the benefits the principle brings in terms of enhancing the child's independent communication.

Personality also played an important role: as one staff member stated, *"it depends on the situation and if somebody is watching you."* Kossyvaki reported a great increase in communication as a result of imitation, as shown in the very large effect size (Cohen's d = 9.88). The current study also returned a large effect size for imitation (Cohen's d = 1.22). This is a big difference when compared with Kossyvaki's study, but the Saudi Arabian staff were still in the early stage of using this principle, and their concerns about being filmed and judged by supervisors, or being judged by other staff, may have affected its adoption. Working with the whole staff and administration to encourage the use of this principle might therefore be necessary to encourage greater use.

Another effective principle that was widely used, easily applied and deemed effective was gaining the child's attention before attempting to communicate. Christie *et al*. (2009) recommended that adults first say the child's name and then address him/her. Nevertheless, it is possible that some children may also require tactile contact (Prizant *et al.*, 2006). Should a situation occur when the child is unresponsive, Christie *et al*. (2009) advise holding the child's hand or gently blowing on their cheek, as well as eliminating possible distracting elements (a loud radio, a toy the child is playing with, etc.). A pause is also suggested immediately after the adult addresses the child. All staff reported this as an effective principle, and all had increased its use considerably post-intervention, with a large effect size (Cohen's d =2.43). The Kossyvaki study did not mention a Cohen's d effect size for this principle (Kossyvaki *et al*., 2014), so these results represent important data in favour of its use.

Following the child's lead and focus of attention was seen as an effective principle, but it was not widely used by the staff, and use was reduced by Wedyan. A possible reason for this might be different definitions given by staff and the researcher for this principle,

resulting in staff confusion. This possibility emerged during the action research discussions after work, when some staff were not clear about what it might mean to follow the child's lead. Discussing real-world examples of how to follow the child's lead, and preferably showing them ways to do it, could help staff to feel more comfortable with this AISI principle. For example, Nind and Hewett (1994) advise adults to comment on the child's actions in order to follow his/her lead. According to Manolson (1992), providing a commentary on the child's actions shows them that the adult wishes to communicate with him/her. Following the child's focus of attention is an important principle and promotes spontaneous speech and joint attention, further verified by research concerning development of the language of infants (Siller and Sigman, 2002; Ingersoll *et al*., 2005; Jones *et al*., 2006).

Staff expressed concern regarding the principle of assigning meaning to the child's random actions and sounds. Furthermore, they described its implementation as difficult, because it requires some creative thinking. This principle is nevertheless supported by the literature (Flack *et al*., 1996; Christie *et al*., 2009). It is in many aspects similar to interpretation, one of the principles of the Hanen approach. In addition, Manolson (1992) asserts that the child knows his parents are listening even if his message is misinterpreted by them, and Bruner (1981) claims that this process is identical to the way mothers teach their toddlers to speak: by constantly assuming the child's expressions are intentional, they encourage them to intentionally verbalise. Comparing the current study's results with Kossyvaki's, she reported a large effect size (Cohen's d=1.23) and the current study returned a medium effect size (Cohen's d=0.50), as the staff reported that it was quite difficult to apply.

Speech with variation in pitch, exaggerated facial expressions and body language were considered effective principles, but were seldom implemented pre-intervention, possibly due to fear of looking unprofessional or even ridiculous on the part of the teachers. However, the studies by Nind and Hewett (2001) and Potter and Whittaker (2001) stated that children can be encouraged to communicate spontaneously through implementation of this principle. Prizant *et al*. (2006) suggest application of distinct strategies based on the sensitivity of each child, advising adults to adapt their intonation to the child's mood. Comparing the current study with Kossyvaki (2014), she had a large effect size (Cohen's d = 0.99) as did the current study (Cohen's d = 1.56), despite staff reluctance. The researcher found that the female staff used this principle more often and more skillfully, as they exaggerated their expressions much better than the men did. More practice, and certainty that other staff will accept what they are doing as the right thing to do, could help staff expand their use of this AISI principle.

Using minimal speech is one of the most important AISI principles, but as staff noted, it is hard to implement for Saudi Arabian staff, as they tend to talk a lot when interacting with children. Excessive speech, as shown in the literature (Klin, 1991), can lead to confusion and even disengagement in the child. In such circumstances adults are advised to repeat themselves while remaining natural (Christie *et al*., 2009). Overestimating the extent to which a child understands their speech is a mistake often made by people working with autistic children (Potter and Whittaker, 2001). By using situational cues to interpret their surroundings, autistic children often mask their language difficulties. The ability to understand other people's language can be limited even for individuals with an extensive vocabulary (Mesibov, 2007).

The staff now appear to realise how important it is to use minimal speech with the children, and recognise that they were using too much speech before the AISI. Comparing the current study with Kossyvaki's study, she had a large effect size for minimal speech (Cohen's d = 1.90), as did the current study (Cohen's d = 2.23), though the staff said they found using minimal speech difficult at the beginning of the intervention because it is not the way in which Saudi people typically speak.

The principle of giving children time to process information was perceived as effective in the literature. Kossyvaki *et al.* (2014) confirmed the effectiveness of giving the child time to process information in her study, which achieved a large effect size (Cohen's d = 1.13). The current study also had a large effect size (Cohen's d = 1.99.) Nind and Hewett (2001) emphasise that the adult should give the child sufficient time to process information, which is particularly necessary for autistic children, as their perceptual and cognitive styles are variable (Bogdashina, 2005). They may be unable to determine whether information is in the foreground or background, or may be able to process stimuli from only one sensory channel (sight or hearing) at a time. They might also pay attention only to one area of stimuli with high focus/tunnel attention and find it difficult to filter out irrelevant details (see *Chapter 2: Literature Review—Theoretical Framework and Context* for additional information.) All of this means that the child may need extra time before they can respond effectuvely. In studies by Woodcock and Page (2010) and Potter and Whittaker (2001), autistic children's processing skills are estimated to be limited by a delay of ten seconds on average. As regards the present study, this particular principle was seen as beneficial by all teachers, who increased its post-intervention use.

The effectiveness of using a wide range of non-verbal cues to guide the children by

physical means to accomplish the tasks they were expected to do achieved a large effect size in the current study (Cohen's d = 1.21); the researcher did not find a Cohen's d measurement for this principle in Kossyvaki's study. The value of this principle is further verified by Doussard-Roosevelt *et al*. (2003). With a sample of nine mothers and their autistic children, they observed mutual interaction and concluded that employing non-verbal communication tools increased the children's engagement. Staff increased use of this principle post-intervention, felt more confident about using it and considered it beneficial. Alahadal commented that this could improve both verbal and non-verbal communication due to the child extending their communicative attempts.

Manolson (1992) emphasised that the adult should try to speak as similarly to the child's own verbal style of communication as possible. Kasari *et al*. (2006) also conducted an intervention for autistic children, during which expanding on the child's communication was a key principle. Kossyvaki *et al*. (2012) conducted an intervention using AISI principles and confirmed that the result improved post-intervention when using this tactic, and that it enhanced the child's communicative attempts. Her effect size was large (Cohen's d = 1.18), which can be compared with current study's even larger effect size (Cohen's d = 2.68).

With regards to responding to all of the child's communication attempts, the literature suggests using this principle to show a child that his/her attempts at communication bring results (Greenspan and Wieder, 1998; Rogers and Dawson, 2010). According to Nind and Hewett (2001), it is important to recognise and reward all of a child's attempts to communicate, including non-verbal ones. When comparing the current study with Kossyvaki's study, she confirmed the effectiveness of this principle with a large effect size

(Cohen's $d = 1.83$). In the current study, this principle achieved the largest effect size of all principles (Cohen's $d = 2.79$).

Offering choices was a frequently used communicative opportunity. In fact, the staff members were using this principle a little pre-intervention, and significantly increased its use after receiving an introduction to the AISI, except for Wedyan (due to her child's situation, as explained previously).

However, staff confirmed that while stopping part-way was an easy tactic to understand, its implementation was quite difficult. This is possibly because of the potential to confuse and distract the child, as Haskoor commented, and also possibly due to the children's limited span of concentration (i.e. they sometimes left immediately after the part-way stop in an activity). In spite of the concerns raised, the principle was considered effective.

The strategy of giving children small portions of food or drink also proved its effectiveness, and its use significantly increased post-intervention. Pre-intervention, staff put the whole portion of food in front of the child, and this made the child less communicative. When the intervention was applied, they recognised how important it was to put the child in an interactive situation where they had to ask for more. This illustrated the point staff made in the pre-intervention interviews: that when they see a new teaching method or intervention being successfully used, they are more likely to use it or continue using it.

The principle of making items inaccessible also proved effective, but its implementation was problematic. For example, staff said they knew the child did not necessarily

understand that they could have their toy back if they asked for it. Staff therefore refrained from using this principle out of concern for upsetting the child unnecessarily. The principle was more effective when the toy taken from the child was the one he/she was playing with at the time, but not a favourite one. Once the child asked for the toy, the staff needed to respond quickly and give it to him, so that rather than becoming upset he would instead see that communication brought a rapid result. The work of Kossyvaki *et al.* (2014) supported this point, but thorough instruction was needed by staff to help them justify its use and to use it effectively.

The strategies of giving children materials they would need help with in order to trigger communication attempts, contradicting the child's expectations, giving non-preferred items, and forgetting something vital were seldom used, especially the contradict expectations idea. This was not used pre- or post-intervention, and during the after-work discussions all staff agreed that they found it difficult to apply and would prefer to take it off the communicative opportunity list.

As for giving children materials that required help, the main claim against it was the need to maintain balance between independence of communication and encouragement of spontaneous speech. This point is crucial, as many autistic individuals gradually become dependent on prompts (Blackburn, 2011) and this principle, if used too extensively, could increase this dependency. In order to prevent asking for help from becoming a process instead of a spontaneous attempt for communication, this principle should be used with a variety of objects and activities. Some of the staff members considered this principle quite ineffective, perhaps reflecting the need to be creative and find new situations in which implementing this principle will feel comfortable for staff.

Furthermore, staff also found it difficult to understand the principle of contradicting the child's expectations. Possibly the definition given was too broad. Although examples were provided for them during their training and it was further explored during the action research discussions after work, they maintained a level of resistance.

In general, the last few principles mentioned appeared difficult to implement with children with poor communication skills, and were consequently doubted by the staff. All the staff stated that they were afraid of the child becoming upset, and of not being able to control and re-calm the child. Teaching staff have a lot invested professionally in being seen as capable of managing children's behaviour during their work. It is natural that they might therefore be concerned about employing AISI principles that could cause a child to protest, act out, or display challenging behaviour. It is important to take this into consideration when training staff. Being open about how these principles can be used in real-world work situations, coping with potential embarrassment and so on will help staff feel more comfortable about trying them.

Kossyvaki (2014) found that the communicative opportunity of offering choices had a large effect size (Cohen's d = 1.53), as did stop part-way (Cohen's d = 1.3), giving small portions (Cohen's d = 1.05) and making items inaccessible (Cohen's d = .087). However, in the current study, give non-preferred items had a large effect size (Cohen's d = 2.76) and was only used post-intervention after the explanation of the AISI. It was used by four of the staff, but Yousef felt uncomfortable and afraid to use it. Give small portions also achieved a large effect size (Cohen's d = 2.35), as noted earlier. Stop part-way had large effect size as well (Cohen's d = 1.55), as did give material the child needs help with (Cohen's d= 1.48), and make items inaccessible (Cohen's d = 1.44). Offer choices achieved a medium effect size, which is different from Kossyvaki's study. Forget

something vital, a communication opportunity not used by Kossyvaki, had only a small effect size: as mentioned, all of the staff tried to avoid using it. Staff may have been able to increase its use by coming up with creative activities where it fitted particularly well, without running into the cultural issues mentioned when cutlery was 'forgotten.'

The reasons that some AISI principles were used more frequently than others could be related to some of the staff's individual characteristics, such as personality, professional status, experience and self-confidence, all factors mentioned by one or more staff during the after-work action research group discussions. At other times, the children's features had an impact, for example: age, verbal ability, usual frequency of spontaneous communication, and mood on the day. There may also be overarching reasons that some principles were seen as easy to use and accepted, while staff struggled to use certain others. These include the hierarchical culture of the specific school and of education in Saudi Arabia generally, the cultural emphasis in Saudi Arabia on respect and hierarchical social roles, and differing expectations and standards for male and female behaviour when working with children. Future research will need to address these factors directly, whether through helping staff to overcome their concerns, or by deliberately designing situations where effective principles can be used without challenging cultural expectations.

Staff decided that creativity was a key element for all AISI principles, to avoid undue repetition that could contribute to rigidity rather than spontaneous communication.

5.6 Summary

This chapter showed that staff were very eager to reflect on and try out almost all of the AISI principles proposed by the researcher. The five staff's use of many of the AISI principles and communication opportunities increased by at least double post-intervention. However, staff concluded that some principles were more effective than others for the specific sample, and some principles were not effective based on teachers' views and the difficulties of implementation.

The next chapter will present results regarding the impact on children's spontaneous communication when adults adjusted their interactive style by applying the AISI principles.

CHAPTER 6: RESULTS – CHILDREN DATA

This chapter presents the results of the intervention phase of the research during which staff applied the Adult Interactive Style Intervention (AISI). Information was collected by means of video recording sessions, which were viewed to derive data concerning the frequency of children's communication attempts during activities and staff communication style, and then analysed to determine the impact of staff communication style on children's communication attempts. It presents data regarding the children's spontaneous communication attempts. First data for the full group is presented, then individual data (see *Appendix 20*). This permits visualisation of areas where there is a notable positive, neutral or negative impact on spontaneous communication for all or almost all children in the group, without losing sight of individual differences. As noted in *Chapter 2*, autism is a heterogenous condition, with wide variations between individuals. While some strategies may be applicable to all or most children, others will be effective for only some.

This data is further analysed in combination with data derived from pre- and post-intervention interviews with staff (see *Chapter 4*), video data regarding adult communication styles (see *Chapter 5*) and the researcher's field notes. Where appropriate, links with relevant literature are discussed throughout. Conclusions are based on all data collected, further analysis and discussions held with the action research group.

6.1 Video data collection and coding methods

Both pre- and post-intervention video recording sessions involved five children whose various activities (i.e. 1:1 work with staff, unstructured free play, breakfast) were recorded in two-hour segments. The frequency of their communicative attempts, as well

as the function (purpose) for communication and the methods they chose, were coded by the author using the Checklist for the Initiation of Communication in Children with Autism (CICCA Kossyvaki, Jones and Guldberg, 2012) In terms of function, the CICCA checklist covers all key communicative purposes. These include pre-linguistic communicative functions such as behaviour regulation, joint attention and social interaction (Bruner, 1981). *Behaviour regulation* consists of verbal or gestural communicative signals to regulate another person's behaviour (Wetherby and Woods, 2006). In this study, behaviour regulation includes requesting, rejecting and protesting. Verbal or gestural communicative signals to draw another person's attention to a person, an object or event, including commenting, giving and seeking information, are coded as joint attention. Verbal or gestural communicative signals to draw another person's attention to oneself are defined as social interaction, and include expressing feelings, seeking attention, seeking approval, initiating social routines and social games. Methods of communication range from pre-symbolic (e.g. motoric acts) to symbolic (e.g. pictures, signs, speech) (Prizant *et al*., 2006). In this study, pre-symbolic methods include challenging behaviour, eye contact, eye pointing, laughing, pointing (contact and distal), proximity, re-enactments, simple motor actions, smiling, vocalisations and babbling. Symbolic methods include echolalia (immediate and delayed), objects of reference, single words, signs/gestures, symbols/pictures and word combinations. For a detailed definition of each communicative function and method, see *Appendix 2*. The following section of this chapter provides more information regarding the coding system used to record the frequency, functions and methods of the children's communication initiations.

6.2 Adjustments to coding methods

The researcher received intensive instruction in coding methods from the developer of the CICCA, Lila Kossyvaki, who is experienced in using the same method. She had tested the CICCA extensively prior to proving the researcher with training, and gave advice for coding the children's communication initiations. Data was manually coded using the CICCA.

An initial trial of this method quickly revealed two issues. First, it was necessary to decide how to proceed when a child repeated the same method for the same reason (for example, when a child would, to show protest, push the adult's hand away and then do so again). Second, there were cases when a child would utilise multiple methods to communicate a single piece of information (for example, to request an object, the child might use a combination of eye contact, vocalisation and physical contact). In these cases, when function and method were repeated, these were recorded as a single occurrence. In addition, a five-second rule was adopted – if the child sustained the method and function, it was considered a second occurrence. The application of this rule would not have been possible if no video footage was used. It was also decided that a single communication attempt would serve a single function (e.g. request or expression of feelings). When two functions were observed, the dominant one was recorded. It is possible to question this decision, but its contribution to simplifying calculations related to the frequency of communication attempts was significant. In cases when multiple communication methods were used, they were all recorded under the corresponding function.

6.3 Results—Frequency of spontaneous communication and effectiveness of AISI principles

Of the five participants, each child demonstrated varying degrees of communicative function, and responded to AISI with varying degrees of success. Results are also likely to have varied due to slight differences in the way staff implemented AISI, which might hinder or encourage communication. This section presents results regarding the methods and functions of children's communication. Information for both individual responses and group responses is provided. A Microsoft Excel spreadsheet was used to collect and sort data, and to determine averages and standard deviations, while further analysis of the data made use of an effect size model, which measured the actual difference made by the intervention (Cohen, 1988; Dancey and Reidy, 2002).

6.3.1 Pre- and post-intervention change/gain scores

The aggregated (averaged) pre- and post-intervention video coded data for all five children and was converted into change scores (i.e., scores that show the difference between pre- and post-intervention scores) and Cohen's *d* effect sizes, to evaluate the magnitude of change in their initiation of spontaneous communication following the intervention. Change (difference/gain) scores are considered best practice when analysing pre-/post-intervention designs (Field, 2005).

Paired samples t-tests (which are often used to analyse simple pre-post designs) were not appropriate for the small sample size (N=5), as the lack of sufficient statistical power would increase the risk of making a type 2 error, i.e. failing to find a significant result that exists in the data.

To statistically determine if the pre-post change scores were clinically significant, Cohen's *d* effect sizes (Cohen, 1988) were calculated. Effect sizes are considered the gold standard for determining how large of an effect has been achieved by an intervention. A large effect size indicates a clinically significant change (increase or decrease) in the behavioural outcomes observed in each child.

6.3.2 Measurement of Cohen's d effect size

The Formula below shows the descriptive statistics (mean and standard deviation) and the Cohen's *d* effect sizes (Cohen, 1988; Dancey and Reidy, 2002) for each outcome measured in this study. Cohen's *d* effect sizes were calculated on the children's video data pre- and post-intervention using Microsoft Excel to determine the size of the change in children's communication initiations observed during three video-recorded activities (i.e., breakfast, one-to-one, and unstructured activity). To calculate Cohen's *d* effect size for each outcome measure, mean values and standard deviations were calculated across data for the five children.

Cohen's *d* effect sizes were calculated using the following formula:

(Group Mean Pre – Group Mean Post)/(Average Standard Deviation)

As mentioned above, the small sample (N=5) reduced statistical power to detect significant pre-/post-intervention effects. Therefore, Cohen's *d* effect sizes were calculated to determine the clinical/practical significance of the pre-/post-intervention change (Dancey and Reidy, 2002). Clinical significance indicates whether the pre-/post-intervention difference is 'important,' i.e. whether the magnitude of the difference is large enough to be clinically useful, in this case whether it would justify implementing the AISI as standard

operating procedure for teachers working with autistic children in Saudi Arabia. The effect size is also a useful index for comparing pre-/post-intervention results across studies (e.g., in a meta-analysis).

Cohen (1988) defined three effect sizes, as follows: $d \geq .2$ small effect size, $d \geq .5$ medium effect size, and $d \geq .8$ large effect size. Based on this classification, the measurement of effect size is essential; the American Psychological Association advises that all research employ this method (Field, 2005). Effect size is becoming more prominent in academic journals, most of which have modified regulations on statistical measurements to include it or have added it in the place of other measures of significance (Cohen *et al*., 2007). In order for the effect size to reveal actual, significant effect, it must reach or exceed 0.8; if it does not, the results are not considered significant (Field, 2005).

6.3.3 Frequency of initiation of communication from video data—Effect size results

The video results can be split into three categories: one-to-one activities with a member of staff, unstructured play and breakfast. Forty minutes of each activity were recorded before and after the AISI intervention and coded with the CICCA, for a total of two hours pre- and two hours post-intervention video recording per child.

Table 11: Results for the children as a group (N=5) regarding number of initiations, group means, standard deviation, and Cohen's d effect size.

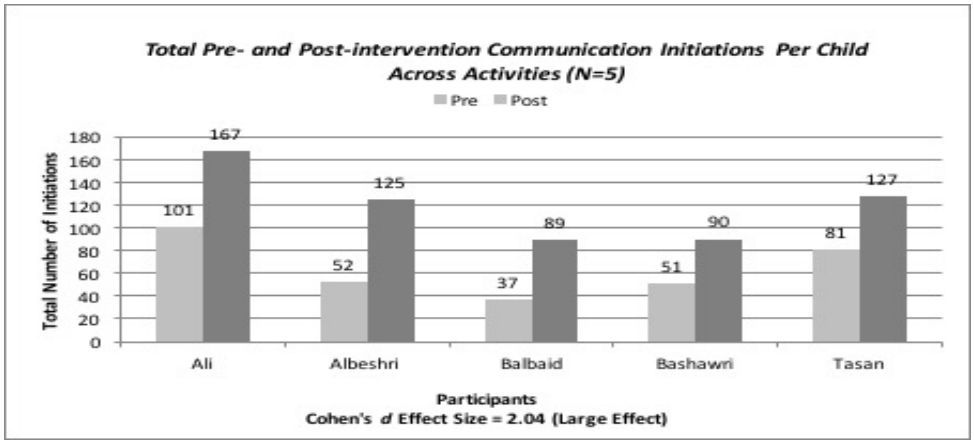
Communication initiations with staff	**Pre-intervention**	**Post-intervention**
Total initiations across 3 activities	322	598
Group means	64.4	116.4
SD	25.98	21.02
Cohen's *d*	**2.04 (large effect size)**	

The number of times the children as a group initiated communication rose from 322 times pre-intervention to 598 post-intervention, and the mean numbers of initiations increased from 64.5 to 119.5. A lower SD was recorded after the intervention, falling from 26 to 21, which was indicative of more uniformity between participants with regards to communicative initiation. In order for the results to be considered alongside previous studies, the mean number of spontaneous communications was also recorded, the post-intervention frequency of which was approximately twice as high as pre-intervention. The Cohen's d effect size was calculated in order to assess the gap between mean group results, which resulted in 2.04, far higher than the 0.8 measure of significance. Post-intervention, communication initiations were significantly higher than those previously recorded.

6.3.4 Total communication initiations with staff pre-post intervention for individual children across three activities

As illustrated in Figure 24, below, every participant had a higher incidence of communicative initiations post-intervention. The total number of initiations by each child also rose significantly; the aforementioned 2.04 Cohen's *d* result substantiates the significance of this increase, suggesting that the intervention brought about meaningful and demonstrable improvement.

Figure 24: Total communication initiations with staff pre-post intervention for individual children across three activities



The highest increase of initiations recorded was for Albeshri, from 52 pre- to 125 post-intervention, followed by Ali and Balbaid with rises of 66 and 52 respectively. The increase in communication initiations by Tasan and Bashawri was lower but still increasing. However, there is a difference between those children who started with a lower number of initiations and those who started with slightly higher number, as two of the three children who began at a lower level made the *most* gains as compared with their starting position. Improvement is about how far someone progresses from the base point, not how high the individual's score is at the end. Nevertheless, all children in the study increased their level of spontaneous of communication in numerical terms, resulting in a large Cohen's *d* effect size.

6.3.5 Change in communication initiations with staff pre- and post-intervention for group

Figure 25: Total Initiations Across Three Activities Pre- and Post-Intervention for Group (N=5)

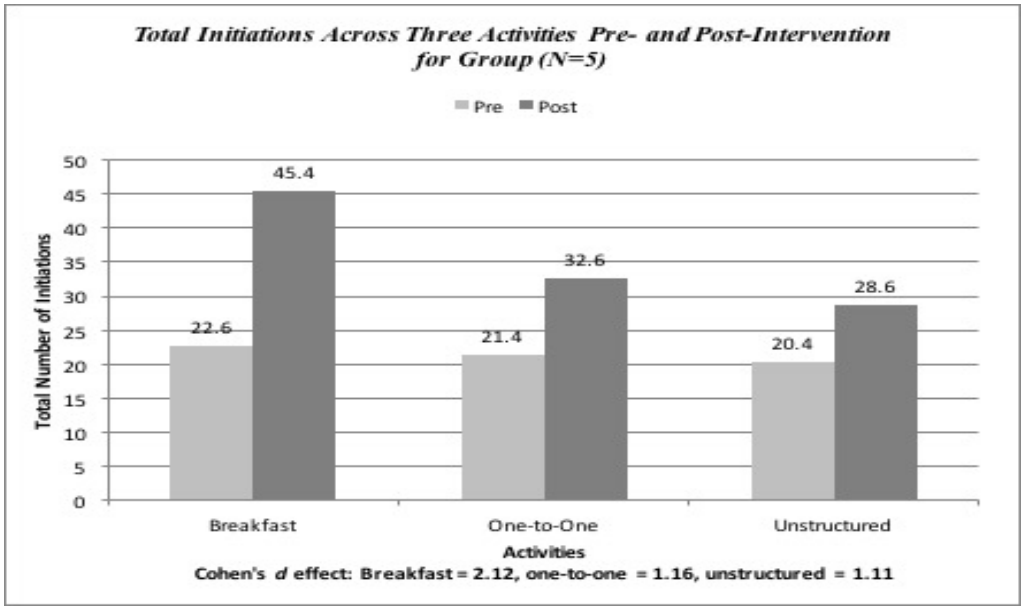
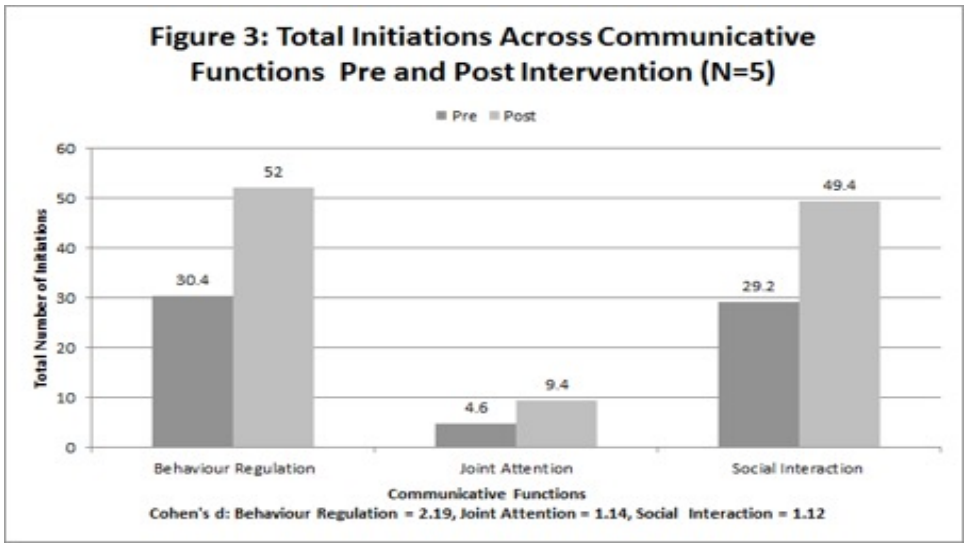


Figure 25, shows the average pre- and post- intervention communication initiations made by the entire group across all three activities (breakfast, unstructured free play and 1:1 work). The greatest change in initiations occurred during the breakfast activity, which increased by 22.8 on average, from 22.6 pre- to 45.4 post-intervention (Cohen's *d* effect = 2.12). The second greatest change in initiations occurred during the one-to-one activity, which increased by 11.2, from 21.4 pre-intervention to 32.6 post-intervention (Cohen's *d* effect = 1.16). For the unstructured play activity, the change in initiations was slightly lower, increasing by 8.2 observations, on average, from 20.4 to 28.6 initiations (Cohen's *d* effect = 1.11). In all activities, the Cohen's *d* score reflected a large effect size.

Figure 26, below, provides greater detail about the pre– and post- intervention changes in initiations in communicative functions. The communicative functions were split into the three broad categories of behaviour regulation (i.e. requesting and rejecting or protesting), joint attention (i.e. commenting or giving information and seeking information) and social interaction (i.e. expressing feelings, seeking attention, seeking approval, social routines and social games). Cohen's *d* effect was calculated to measure the size of the difference between group means in terms of standard deviation.

Figure 26: Total pre– and post- intervention changes in initiations in communicative functions.



The largest increase in initiations, on average, was for communications initiations related to behaviour regulation, which increased by 21.6 initiations, from 30.4 pre-intervention to 52 post-intervention (Cohen's *d* effect=2.19). Communications initiations for social interaction increased on average by 20.2 initiations, from 29.2 pre-intervention to 49.4 post-intervention (Cohen's *d* effect=1.12). Joint attention-based communication initiations increased the least, by just 4.8 initiations on average, from 4.6 pre-intervention to 9.4 post-intervention (Cohen's *d* effect size=1.14). However, communications initiations related to

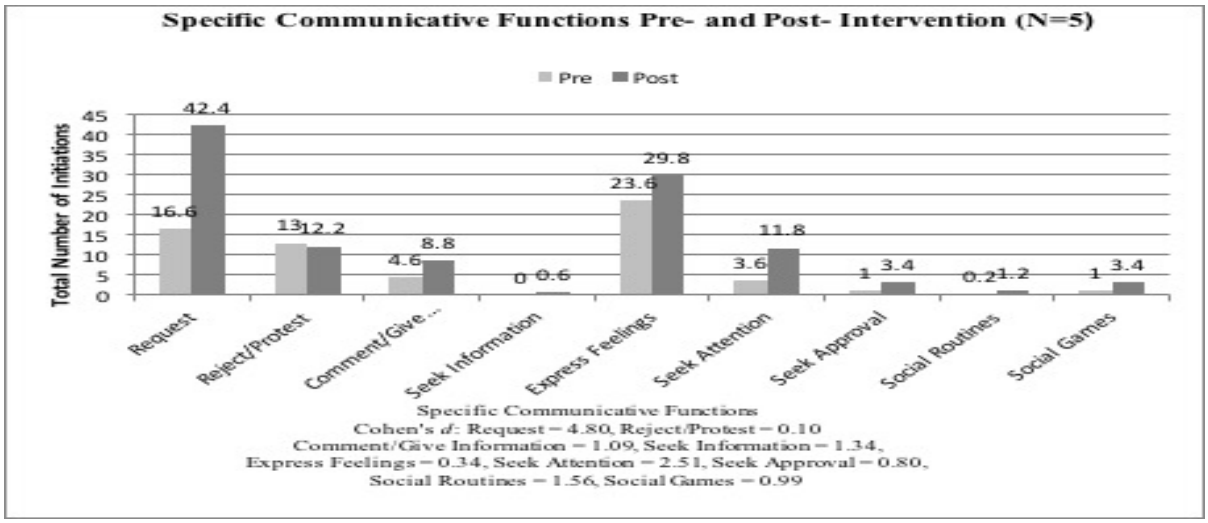
joint attention were low to start with pre-intervention, so the increase is almost double. Relatively speaking, frequency of communications initiations for joint attention has improved the most.

In all cases the Cohen's *d* effect score met the criteria for large effect size. This result reflects the findings of Mundy (1995) and Chevallier *et al*. (2012). Mundy (*op cit*.) highlighted that the type of reward may affect the frequency of behaviour regulation and social-emotional acts (e.g. joint attention and social interaction). Behaviour regulation acts result in non-social rewards (e.g. the child gets the toy they want) whilst social interaction acts give rise to social behaviours (e.g. eye contact, sharing of affect). Behaviour regulation acts are more frequent than other types of social communication in people with autism, as one might expect given how the neuropsychology of social development is affected in autism. Mundy (*op cit*.) suggests that different types of social communication are influenced by different neurological systems, although these overlap and influence each other. Further reinforcing the theory that the neuropsychology of social development has an impact on forms of communication initiation, Van Zeeland *et al*. (2010) found that there were reduced neural responses to social stimuli in children with autism. Chevalier *et al*. (*ibid*.) present evidence of the key importance of social motivation as a key factor in how autism is expressed, including results of several studies that show the impact of adult behaviour, such as adult communication behaviours that are designed to increase the child's interest in something, on social motivation. Communication for behaviour regulation, therefore, can be assumed to require less scaffolding and encouragement by adults, and should increase more quickly than other forms of communication under good or optimal circumstances. Conversely, children with autism will struggle more to initiate other forms of communication, even when adults change their behaviour or the

circumstances of communication are otherwise improved.

Figure 27, below, shows the number of pre- and post-intervention initiations for each specific communicative function (e.g. request/reject, seek information, express feelings).

Figure 27: Specific Communicative Functions Pre- and Post- Intervention (N=5)



The number of requests concerning *Behaviour Regulation* increased by 25.8 (Cohen's *d* effect = 4.8); whereas the number of rejects/protests slightly increased by 0.8 (Cohen's *d* effect = 0.10, small-effect size). This is a positive finding, as it indicates that the children are now able to communicate their needs to the teacher more often, and so presumably more effectively (42.4 requests post-intervention) than pre-intervention (16.6 requests).

Joint attention: There was quite improvement in joint attention post-intervention as follow. Commenting/giving information increased the most, by 4.2 initiations (Cohen's *d* effect= 1.09, large-effect size); whereas seeking information increased from 0 to 0.6 initiations (Cohen's *d* effect = 1.34, large-effect size).

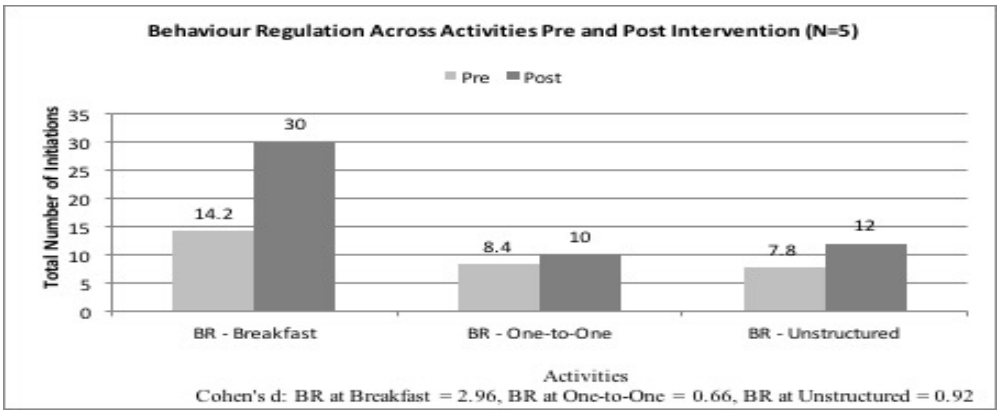
Social interaction: Among the five social interaction items, seeking attention showed the greatest gains among the children, with 8.2 more initiations post-intervention (Cohen's *d* effect = 2.51, large-effect size). The next greatest gain was for social routine (Cohen's *d* effect = 1.56, large-effect size). Social games also showed a large effect size (Cohen's *d* effect = 0.99). The effect size for expressing feelings was small. It should be noted here that many of Tasan's feelings pre-intervention were negative (e.g. frustration, anxiety, anger), whilst the rest of the children expressed both negative and positive feelingd (Cohen's *d* effect = 0.34); whereas the effect size for social games was large (Cohen's *d* effect = 0.99). These findings highlight the importance of using the effect size as a more comparable estimate of change.

Figure 28 in the next section shows behaviour regulation change across all three activities. Behaviour regulation increased the most during the breakfast activity (increase of 14.8 initiations, Cohen's *d* effect = 2.96, large-effect size); followed by unstructured activities (increased by 4.2 initiations, Cohen's *d* effect = 0.92, large-effect size); and then one-to-one activities, which increased by 1.6 initiations (Cohen's *d* effect = 0.66, medium effect size).

6.3.6 Communicative functions in detail

6.3.6.1 Behaviour regulation across activities

Figure 28: Behaviour Regulation Across Activities Pre and Post Intervention (N=5)



6.3.6.2 Joint attention across activities

Figure 29: Joint Attention Across Activities Pre- and Post- Intervention (N=5)

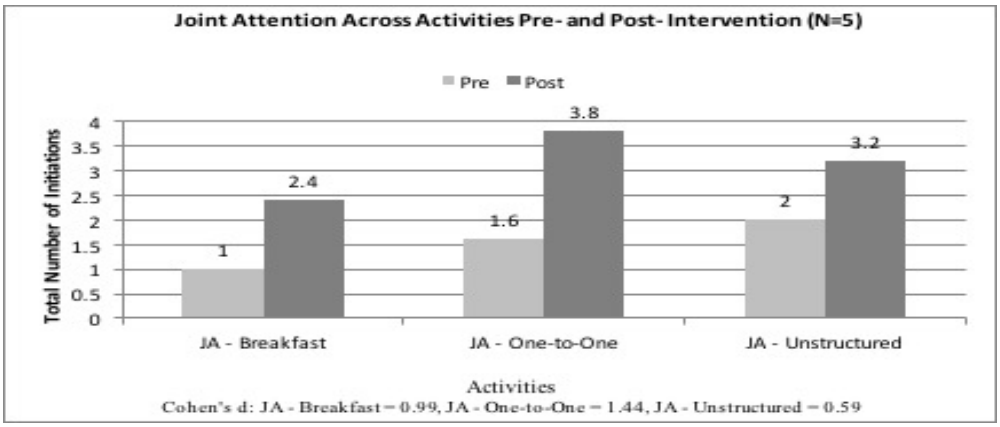


Figure 29, above, shows the change in joint attention for each activity. Joint attention functions (i.e. commenting or giving information and seeking information) were the least frequent form observed. Commenting was coded when *"the child showed or spoke about people, objects or events that were either readily apparent to the listener or related to past*

or future events" (modified from Stone and Caro-Martinez, 1990). Seeking information was coded when *"the child asked for information about people, objects or events that were either readily apparent to the listener or related to past or future events"* (modified from Stone and Caro-Martinez, 1990). Commenting was seen more often than seeking information. Joint attention increased most during the one-to-one activity (an increase of 2.2 initiations, Cohen's *d* effect = 1.44, large-effect size); by 1.4 initiations during breakfast (Cohen's *d* effect = 0.99, large-effect size); and by 1.2 initiations during unstructured activity (Cohen's *d* effect = 0.59, medium-effect size).

6.3.6.3 Social interaction across activities

Figure 30: Social Interaction Pre- and Post- Intervention (N=5)

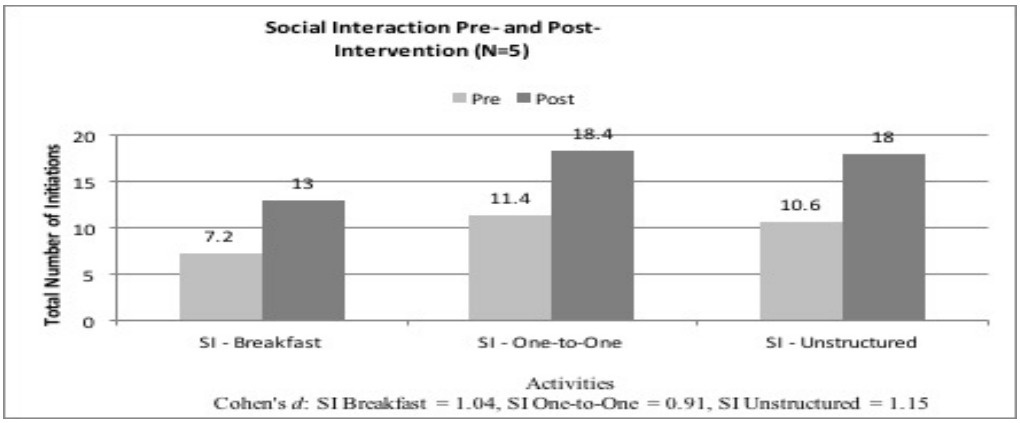


Figure 30, above, shows that, on average, there were positive increases in social interaction for the children across all activities, particularly during the unstructured activity and breakfast, and then during the one-to-one activity. Social interaction increased on average by 7.4 initiations during unstructured play (Cohen's *d* effect = 1.15, large-effect size), by 5.8 initiations during breakfast, (Cohen's *d* effect = 1.04, large-effect size), and by 7 initiations during the one-to-one activity (Cohen's *d* effect = 0.91, large-effect size).

6.4 Reflecting on the changing communicative functions—Results from the interviews

Participating staff members were encouraged in interviews to describe the way in which the children's communication styles had changed post-intervention, both in terms of prevalence and variation. The answers provided were congruent with the results gathered from the video recordings, with almost all staff members reporting an increase in spontaneous communication. For example, Olfat explained how she has noticed that the child he works with benefitted from AISI: *"He is asking you for something when he knows it is not its time, and if you reassure him that it is coming or ask him to wait, he is accepting this."*

Most of them agreed that all children significantly increased their requests, especially during breakfast, due to teachers changing their interaction style regarding the breakfast activity. Staff started to give the children small portions instead of giving them the whole meal, precipitating requests for more. Moreover, the staff stated that the children have increasingly commented on things and have sought attention. These responses indicate that children's behaviour was perceived by the staff in ways that are similar to the researcher's interpretations of the video recordings.

However, not all of the data matches up. While staff said that social routines were more frequent following the intervention, video footage does not support this assertion. This inconsistency may be due a lack of precise definitions with regard to types of initiations, with behaviours such as requesting and approval possibly being interpreted by staff as 'social routines.' Alternatively, the Hawthorne effect (French, 1953) could have resulted in this incongruence, as slight differences in style may have affected perceived response. In summation, these differences in interpretation are most likely due to individual differences

between staff interpretation of both the key terms and the child's responses, as preserving uniformity across all staff members is a near-impossible task.

6.5 Reflecting on the changing communicative functions—Results from contemporaneous staff reports and researcher field notes

Participating members of staff were encouraged to approximate how many times each form of spontaneous communication, namely social interaction, joint attention and behaviour regulation, was observed. This reporting task was undertaken once a day over a five-day period, during which the staff were also asked to rate the level of communicative improvement of the children using a three-point scale.

Table 12: Frequency of spontaneous communication reported by staff across communication types, by child. *In this table N=Not at all (0 times), F=Few times(1-5 times) , M=Many times (more than 5 times).*

	Ali	***Albeshri***	***Balbaid***	***Basawri***	***Tasan***
Behaviour Regulation					
Request	***M***	***M***	***M***	***M***	***M***
Reject	***M***	***F***	***F***	***F***	***F***
Joint attention					
Comments/Giving info	***M***	***M***	***F***	***M***	***M***
Seek info	***F***	***N***	***N***	***N***	***N***
Social interaction					
Express feeling	***M***	***M***	***M***	***M***	***M***
Seek approval	***F***	***F***	***F***	***F***	***F***
Social routines	***F***	***F***	***N***	***F***	***M***
Social games	***M***	***F***	***F***	***F***	***F***
Seek attention	***M***	***M***	***M***	***M***	***M***

Every staff member reported during the action research meetings that requesting was demonstrated frequently by the children, and most agreed that children made attempts to initiate request functions most often. Rejecting behaviour was exhibited far less frequently,

though there were discrepancies between the testimony of the staff and the observation data collected by the researcher, as the staff could not accurately recall the number or the nature of every interaction. In accordance with the observations of Olfat and Wedyan, children commented on occasion. The communicative function to seek information was observed by three of the participating staff members, while two noted no instances of seeking information.

In terms of social initiations, it was unanimous amongst the staff that emotional expression became more frequent, even if the child demonstrated this function pre-intervention. Five of the staff members noted attention-seeking behaviours in the children. Further, the initiation of games and social play was observed, notably by Olfat and Yousef. Yousef stated that Balbaid was receptive to encouragement to initiate social play, and increased the frequency with which this initiation was demonstrated. Social communication also became more frequent with Tasan and Ali, whose behaviours included greeting and bidding farewell through action and gesture, e.g. waving.

Observation records and staff responses are once again not perfectly aligned with regards to approval-seeking behaviours. Sometimes failings in staff memory meant that not all instances were recalled, but the majority of staff reports agreed with the video recordings with regards to the frequency of this function.

For the most part, the testimony of the staff and the evidence collected from the video recordings were congruent. As noted, there were a few inconsistencies between the two, calling for an examination of the reasons behind this phenomenon. One possible explanation of this might be the failure of the staff to notice some communicative initiation attempts. This may be due to the demands of the entire class and the pressures

of teaching whilst also implementing AISI. It is understandable, then, that the staff may have missed attempts at expressing a communicative function due to attending to multiple students at once. In addition, the researcher has the advantage with regards to noticing these attempts as it was his only role.

Arguably the most interesting difference between staff and researcher findings was the absence of emotional expression in the testimony of the staff, while the researcher did detect emotional expression. While it has been put forward that autistic children find expressing their feelings extremely difficult, it may be that the staff had a different definition of emotional expression to the researcher, which would account for this inconsistency (Dawson *et al*., 1990; Ozonoff *et al*., 1990). Few naturalistic studies have included the function of expressing feelings. Stone and Caro-Martinez (1990) found that this function was coded very few times. This might have happened for two reasons. Firstly, the fact that the observations were not video recorded could have led to missing occurrences, as emotions are often expressed in unconventional ways by people with autism (Mesibov *et al*., 1997; Freeman *et al*., 2002). Secondly, the widespread belief at the time of Stone and Caro-Martinez's research (i.e. 1990s) that children with autism rarely express their feelings (Dawson *et al*., 1990; Ozonoff *et al*., 1990) could have biased the observers. The expression of feelings was coded for 10% of the total communicative acts in Agius's study (2009); while Freeman *et al*. (2002) reported that the most frequent function thirty-six students with autism (aged from 6 to 24 years) seen while they were interacting with familiar adults was expressing feelings. It should be noted here that these students were filmed during unstructured social interactions, which possibly gave more opportunities for participants to express their feelings than a classroom situation. However, Agius (2009) observed her sample during meal times, and Stone and Caro-

Martinez included observations that were made during unstructured activities, such as lunch. However, their findings were very different. Freeman *et al*. (2002) acknowledged that expressing feelings does not appear in many studies as a frequent communicative function in autistic people, as they tend to use unconventional behaviours to convey emotions, and these may not be recognised by unfamiliar adults.

In this research, I recognised emotional expression at times, but staff did not. This may be because staff have learned during their studies that children with autism have difficulty with emotional expression or are 'emotionless' - such fallacies still crop up in teacher training materials and on websites that teachers might look at. Also, as noted above, emotional expression in people with autism may be idiosyncratic. If this is the case, adults may not recognise emotional expression when it occurs. It is also possible that staff were not looking for emotional expression because it is not an area that the remedial plans (IEPs) for the child highlights as an educational goal.

6.6 Communicative methods

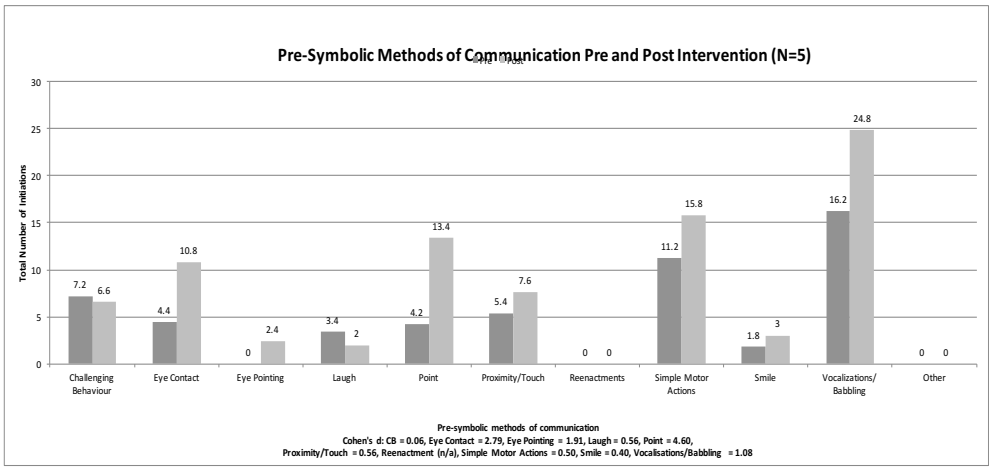
The following section focuses on those methods of initiation used by children that resulted in the highest effect size, as well as data regarding the total and averages of the methods before and after the intervention stage. This data is then considered within the context of the wider field and the results of previous studies with similar aims.

Figure 31 and *Figure 32* below, present pre- and post-intervention communication initiations across two types of communication commonly used by autistic children: pre-symbolic (e.g. challenging behaviour, pointing, facial expressions, simple motor actions, etc.) and symbolic (e.g. echolalia, sign/gesture. symbols/picture, verbal speech). Overall,

there was much greater post-intervention use of pre-symbolic methods (e.g. simple motor actions, vocalisations/babbling), and positive gains were seen in most of these areas. The use of pictures/symbols by the children was still the dominant pre- and post-intervention symbolic method, however.

6.6.1 Pre-symbolic methods of communication

Figure 31: Pre-symbolic methods of communication pre- and post-intervention (n=5)



Pointing showed the greatest gain, with an increase of 9.2 (Cohen's *d* effect = 4.6, large-effect size); followed by eye contact, with an increase of 6.4.4 (Cohen's *d* effect = 2.79, large-effect size); then eye pointing, with an increase of 2.4 (Cohen's *d* effect = 1.91, large effect size); vocalisation/babbling, with an increase of 8.6 (Cohen's *d* effect = 1.08, large-effect size); proximity touch (increase of 2.2 Cohen's *d* effect = 0.56, medium-effect size); smiling, with an increase of 1.2 (Cohen's *d* effect = 0.40, medium-effect size); and simple motor action, with an increase of 4.6 (Cohen's *d* effect = 0.5, medium-effect size). Laughing also decreased, with 1.4 fewer initiations of laugher post-intervention (Cohen's *d* effect = 0.56, medium-effect size).

In contrast, challenging behaviour decreased by 0.6 initiations at post-intervention (Cohen's *d* effect = 0.06, small-effect size). Re-enactments and other pre-symbolic methods were unchanged.

6.6.2 Symbolic methods of communication

Figure 32: Symbolic Methods of Communication Pre- and Post-Intervention (N=5)

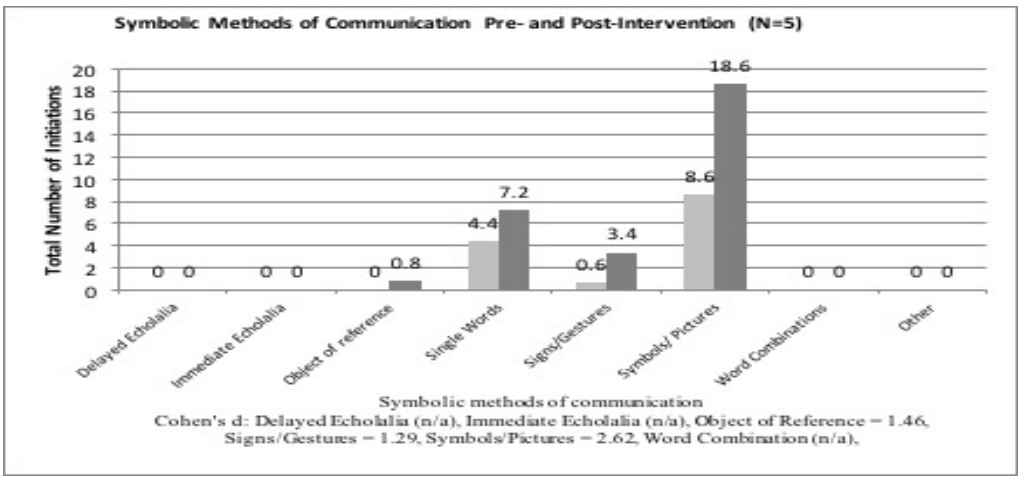


Figure 32, above, shows that the greatest improvement in symbolic methods of communication among the five children was their increased use of symbols/pictures to communicate with their teacher following the intervention. This method increased by 10 initiations, and the effect size was very large (Cohen's *d* effect = 2.62). The next biggest improvement was in their use of sign/gestures to communicate, which increased by 2.8 initiations post-intervention, with a large effect size (Cohen's *d* effect = 1.29). There was also a very small increase (0.8 more initiations) in their use of objects of reference post-intervention, which was still a large effect size (Cohen's *d* effect = 1.46).

Three of the symbolic methods of communication were not used at all by the five children during the study. These were delayed echolalia, immediate echolalia, and word combinations, which were not relevant to their particular ability.

6.6.3 Use of single words

Only one child in this study (Albeshri) had the ability to use a very limited vocabulary of single words. Therefore, it was not appropriate to calculate an average or standard deviation or effect size for use of single words observed in the five children. Data on Albeshri's use of single words was excluded from summary measures in group means, as it would distort the mean values for the full sample.

Albeshri spoke 22 single words at the pre-intervention stage, which increased to 36 single words at the post-intervention, a 14-word gain. Therefore, the teacher training intervention appeared to have been successful for Albeshri, as he increased his spontaneous verbal communication from 52 to 125. However, Albeshri was self-conscious and nervous in the post-intervention stage as his family had reduced his medication.

6.7 Changes in communicative methods in children from staff reports and field notes

During the intervention phase, the staff were prompted to approximate the frequency with which the children demonstrated each communicative function. This was carried out at the end of each day of a five-day period and the frequency of the function was recorded on a three-point scale, as determined by the staff member. The results can be found in *Table 13: Pre-symbolic methods* and *Table 14: Symbolic methods*, below.

Table 13: Frequency of spontaneous communication reported by staff across communication types, by child Pre-symbolic methods

	Ali	*Albeshri*	*Balbaid*	*Basawri*	*Tasan*
***Table 13*: Pre-Symbolic methods**					
CB	***M***	***F***	***N***	***F***	***M***
Eye Contact	***M***	***M***	***M***	***M***	***M***
Eye pointing	***F***	***F***	***F***	***F***	***F***
Laugh	***F***	***F***	***F***	***F***	***F***
Pointing	***M***	***M***	***M***	***M***	***M***
Proximity/ Touch	***M***	***M***	***M***	***M***	***F***
Re-enactments	***F***	***F***	***N***	***N***	***F***
Simple Motor Actions	***M***	***M***	***M***	***M***	***M***
Smile	***M***	***F***	***F***	***F***	***M***
Vocalisation/Babbling	***M***	***M***	***M***	***M***	***M***

Table 14: Frequency of spontaneous communication reported by staff across communication types, by child Symbolic methods

	Ali	***Albeshri***	***Balbaid***	***Basawri***	***Tasan***
***Table 14*:** **Symbolic methods**					
Delayed Echolalia	***N***	***N***	***N***	***N***	***N***
Immediate Echolalia	***N***	***N***	***N***	***N***	***N***
Object of reference	***F***	***F***	***F***	***F***	***F***
Single Words	***N***	***M***	***N***	***N***	***N***
Signs/Gestures	***M***	***F***	***F***	***F***	***F***
Symbols/ Pictures	***M***	***F***	***M***	***M***	***M***
Word Combinations	***N***	***N***	***N***	***N***	***N***

Interviews with staff during the intervention stage revealed that staff reports were very close to what the researcher had derived from examination of the video recordings. Vocalisations and physical closeness were the most commonly observed methods of initiation, both before and after intervention. When gesturing, the most frequently observed methods in both the staff reports and the video recordings were gesturing with the eyes or pointing. Staff also noted that these methods increased in frequency post-intervention. Many members of staff also noted that on particularly productive days, three of the children made use of re-enactments in order to communicate with the staff, though this was indicated by the staff rather than the video footage, which does not indicate re-enactment post-intervention.

Regarding challenging behaviour, both staff responses and video recordings indicate challenging behaviour throughout the intervention stage, with the exception of Balbaid. Staff reported that one participant, Ali, demonstrated an increase in challenging behaviour after the intervention stage, as one of the only children to have demonstrated this type of behaviour pre-intervention. Another, Abeshri, was said to begin to demonstrate challenging behaviour largely due to a change in medication. These results are in line with the findings from the video recordings.

Moving on from pre-symbolic means, staff approximations of frequency and data derived from the video recordings were very similar with regards to symbolic functions, primarily the use of visual aids and symbols. In terms of verbal communication and initiations, Albeshri was the most advanced, demonstrating one-word initiations before and after the intervention; this was rated as '*very often*' in frequency by the staff. While Ali used gestures as his primary symbolic means, he also demonstrated singing as initiation, unlike the other children.

Understandably, it is a huge task for the staff to attempt to mentally note and recall instances of spontaneous communication, particularly after a stressful day. At the start of the research in particular, a lot of the staff expressed this difficulty and struggled to remember the classifications of behaviour. However, during the intervention and afterwards, through their participation in the action research meetings and training, the staff became more familiar with the process and were more receptive to providing feedback.

6.8 Reflections on the changing communicative methods from interviews with staff

During the interview stage, the methods by which the children communicated over the course of the study were difficult to report due to their complexity. Resources were provided to staff that outlined the communicative methods and their characteristics, which they could refer to during the interview. During this stage, the staff were asked to report how the children had responded to the intervention, as well as the ways in which they felt their style had changed.

The results of these semi-structured interviews largely concurred with those derived from the observation data and the video recordings. Staff stated that Balbaid stood out as the child whose communicative initiation had improved the most, as he very rarely communicated before the intervention. His staff found that AISI was helpful because they began to give him more time to process information, waiting for him to initiate. Staff also endeavoured to give him more opportunities to communicate (e.g., giving him a bottle of water that was tightly closed to encourage him to ask the staff for help. Staff, testimony was supported by video data. There was also staff consensus that all children increased their use of physical gestures, such as initiating eye contact, as well as their use of visual aids and symbols. Staff, interestingly, noted a far higher incidence of reenactment than the video recordings would suggest, for example, Olfat noted that Ali *"seeks to re-enact a game when he finishes his session in unstructured free play."* This was not captured in the video recordings.

6.9 Discussion of results

Of the communication methods under study in this research, requesting was observed the most often, a result supported by related research. Chiang, in individual research and in collaboration with Lin, found that requesting was observed most often amongst their sample of 34 autistic children between the ages of two and sixteen (Chiang and Lin, 2008, and Chiang, 2009). An older study conducted focusing on 30 autistic children between the ages of four and 13 concluded that requesting was in the top three most frequently recorded methods of communication, comprising 22 percent of all initiations (Stone and Caro Martinez, 1990). Another study by Kossyvaki (2010) also found that, of a sample of six autistic children, the most commonly reported method of communication was requesting.

On a related note, a number of previous studies have found that, in terms of frequency, rejecting and requesting were extremely close. In their 2001 study, Potter and Whittaker observed that the three most frequent methods of communication were protesting, rejecting or requesting. A related study by Agius (2009) found that requesting and protesting were the two most frequently observed behaviours during meals amongst the eleven children studied, all of whom were autistic and non-verbal. Requesting is one of the first communicative functions observed in young children. So while TD children initiate requests at an earlier age and more frequently, it is significant that in this study children who communicate infrequently were seen to increase the level of requesting. There is a tendency for children with autism to get ‘stuck’ in the requesting stage (as often seen by PECS practitioners), so staff will need to ensure that they respond quickly to requests and expand on communication to help children move on to other functions.

The results of the current study demonstrated that instances of emotional expression became more frequent after the intervention, though these were present before the intervention stage as well. The rise in emotional expressions, both negative and positive, after the intervention are very likely to do with the added attention of the staff, an increase in receptiveness, and the introduction of unfamiliar communicative processes. Kossyvaki *et al*. (2013) also found that after the implementation of an AISI, the rate of emotional expression rose significantly.

While autistic individuals with verbal proficiency often claim to have extreme levels of negative feeling, these reports tend to come from young adults at the upper end of the spectrum (e.g. Jackson, 2002; Grandin, 2006; Sainsbury, 2009) or from older research (for example, Capps *et al*., 1993; Bieberich and Morgan, 1998). With regards to individuals with autism who are non-verbal, findings differ, and it has been suggested that this perception surrounding autistic individuals and negative emotion is one that may form a self-perpetuating stereotype. Studies have found, for example, that mothers of autistic children are less likely to smile in response to their child's initiations than mothers of TD children (Dawson *et al.,* 1990). Therefore, further attempts should be made to acknowledge the challenges that autistic individuals face when attempting to express emotion and read it in others, and encouragement and space should be given by neurotypical individuals to autistic individuals to notice and respond to their expression of emotions and to support them in building emotional reading skills.

Amongst similar studies on autistic individuals in naturalistic environments, there was little discussion of emotional expression in the past, and it was observed infrequently within these studies (for example, Stone and Caro-Martinez, 1990). The lack of evidence for

emotional expression within past studies may be due to the lack of video evidence, as many of these studies did not implement recording devices; researchers therefore relied on the discretion of the teachers or parents involved in said studies, who may not have interpreted the child's expressions as emotional (Mesibov *et al*., 1997; Freeman *et al*., 2002). In addition, during the early stages of scientific autism research in the early 1990s there was an ingrained belief that autistic individuals almost never expressed emotion (for example, Dawson *et al*., 1990; Ozonoff *et al*., 1990), a perception that may have skewed results: one is unlikely to see what one does not expect to see.

In the current research, the average prevalence of emotional expression before the intervention was 23, rising to 30 after the intervention stage; as previously indicated. Illustrating the point made previously regarding how expecting and therefore looking for emotional expression can impact results, Stone and Caro-Martinez (1990) noted this function very infrequently, at around 1.5 percent of total interactions, while Freeman *et al*. (2002) found that emotional expression was the highest recorded function amongst the study's sample of 36 autistic children and young adults. This high level of emotional receptiveness is perhaps due to the nature of the environment their research took place in, an unstructured setting in which free social interaction was encouraged.

In the current study, providing information and commenting were recorded nine times after the intervention stage compared to five instances before intervention, though most instances were initiated by Ali. This finding is supported by earlier research, which found a total of 41 instances of commenting, though information-seeking only seven times (Stone and Caro-Martinez, 1990). In a study by Kossyvaki *et al*. (2014) with many parallels to the current research, the average pre- and post-intervention rates of commenting functions

were 5 and 12 respectively.

Attention-seeking behaviour, one of the functions included in the current study, was observed 4 and 11 times pre- and post-intervention, respectively. In early studies, however, attention-seeking behaviour was amongst the most commonly observed, and was the most frequent in Stone and Martinez's 1990 study, at 23 percent of all initiations. Again, Aguis' (2009) results suggested a far lower frequency of attention-seeking behaviour. Due to the gap between these studies, the way in which the researchers and participants understood the term 'attention seeking' most likely varies significantly, as Stone and Caro-Martinez considered the child glancing at the adult an attention-seeking behaviour, which would not be assumed to be the case in more recent studies.

The frequency with which children in this study engaged in spontaneous social play rose post-intervention for most of participants, with the exception of Albeshri, who would often gesture to objects rather than clearly indicate that he wanted to play. Similar results were observed by Kossyvaki *et al*. (2014), as indicated by the large Cohen's *d* effect size of 1.48. During her study most of the children initiated social games more often post-intervention.

Another factor in the contrast between the results of similar studies is different systems for categorisation of functions, a consideration when comparing studies. Chiang and Lin, for example, did not consider social play a function in and of itself, but rather considered the initiation of a game a form of request behaviour.

These results are particularly pertinent to the discussion surrounding the advancement of communicative ability in TD children. According to the theory of social communication

development and the work of Bruner (1981), the functions that are present before speech develops in a young TD child are threefold: joint attention, social interaction, and behavioural regulation. Autistic children differ from TD children in how these functions manifest themselves, with the former achieving each function separately and the latter developing them simultaneously (Wetherby, 1986). Research by Wetherby suggests that behavioural regulation, such as requesting and rejecting behaviours, is often the first to appear in autistic infants. Indeed, requesting was found to be the most frequently observed function post-intervention in the current study. Kossyvaki *et al*. (2014) and Wetherby also argue that this function is followed developmentally by social interaction, such as expression of feeling, seeking attention or initiating social game, all functions with a high effect size in this study, with the notable exception of emotional expression, which was observed similarly before and after the intervention stage.

Those behaviours defined as serving the communicative function of joint attention were the last to be observed in autistic children, according to Wetherby (1986). In a later collaborative study, Wetherby *et al*. (2007) compared TD, DD and autistic children, revealing a similar capacity for regulation of actions between all children, though social interaction and joint-attention was far less frequent in autistic children. The results of the current research are highly compatible with the assertions of Wetherby's theory (1986), as the post-intervention data indicates first a proficiency for regulation, at 52 instances, 49 for social interaction and just 9, on average, for joint attention functions.

It is important to reiterate that while Wetherby's theories appear to have been corroborated by later research in a general way, these observations will not apply to all autistic children due to the heterogeneity of the population. In addition, these observations may not

represent an inborn divergence in developmental trajectory that occurs in children with autism, but may be the expression of differential developmental experiences due to sensory-perceptual, cognitive or affective differences in autism. For example, within the context of theories of social motivation as they relate to development, the following suggestion by Chevallier (2012) is highly relevant:

> *"People typically engage in prosocial behaviors not because they expect some kind of direct benefit to offset their efforts but because they find it inherently rewarding."* (Chevallier *et al*., 2012: p. 232)

While this excerpt addresses the neurotypical experience, it raises the question as to what is inherently rewarding for autistic individuals and whether it differs from that outlined above. A study by Scott Van Zeeland *et al*. (2010) attempted to explore this question by comparing the value of social currency against actual currency, which took the form of coins and positive facial cues, respectively. The study had two sample groups, consisting of 16 autistic boys and 16 TD boys. Van Zeeland found that the former did not respond to the reward of social stimuli in the same way as the latter, indicating that the nature of the benefit offered for behaviour is key to the frequency of initiative functions (Mundy, 1995; Chevallier *et al*., 2012). The results of the Van Zeeland study suggest that tangible rewards, such as toys or sweets, are more suited to encouraging behavioural regulation, while social stimuli will encourage the use of social functioning, such as physical closeness, eye contact or smiling.

Key to understanding why functions relating to behaviour regulation occur most frequently is understanding the neuropsychology of social development, as different parts of the brain

and neural processes are responsible for different social functions (Mundy, 1995). The frontal lobe, for example, is the base for the majority of feelings-based social behaviours. Regulation, on the other hand, can be largely attributed to internal reward systems and chief cognitive functions. In autistic children, Mundy (1995) suggests, the part of the neural system responsible for regulation is more effective than that which relates to emotion-based behaviour, an assertion that is supported by Scott Van Zeeland *et al*. (2010), who discovered that autistic children did not exhibit significant brain activity in response to social reward.

In regards to previous studies relating to communication methods in young children, there has been relatively little mention of the actual methods preferred by autistic individuals. Instead, researchers have focused on overarching methods such as AAC (aided and unaided), gesture, vocalisations, and verbal initiation (Chiang and Lin, 2008; Chiang, 2009; Stone and Caro-Martinez, 1990). An exception is Potter and Whittaker (2001) who chose to record those methods which they observed in the children, instead of beginning their research with a list of possible methods to be observed. This work resulted in a set of methods similar to that later utilised by Kossyvaki (2014).

The high frequency with which eye movement, vocalisations, and gesturing were observed by the researcher in the current study, and the large effect size, suggests a heightening of awareness in the children in relation to the staff after the intervention stage. In particular, the increase in eye movement and motor action suggests an increased distinction between objects and human beings, with more positive emotional reactions being observed towards the latter, specifically the participating staff members.

When the group frequencies were considered, the methods which saw the biggest increase

were pointing and other simple motor actions, as has been seen in numerous previous studies, including those by Kossyvaki (2010) and Stone and Caro-Martinez (1990). In these studies, simple motor actions were the most commonly observed, which echoes what the present research found. At all stages, Pointing, vocalisations and simple motor actions were the most frequently seen, with vocalisations the second highest of all methods.

The Cohen's *d* effect size of laughing as a function in the current study was 0.56, and it was 0.40 for smiling, which was recorded for all stages though infrequently. This result was comparable to the findings of Kossyvaki *et al*. (2014), in whose study the Cohen's *d* effect size for laughing was 0.66 and for smiling was 0.98, slightly higher than current study. Agius in her 2009 study, in which smiling and laughing averaged at 10 and 6 respectively and the current study was 8 and 6 respectively. This could be due to the variation of activities the children were observed undertaking and the child's mood, as in the current study children were video recorded in places such as the free play area or during unstructured free play in the class, while Kossyvaki observed the children in a sensory room designed to stimulate and encourage positive affect, an environment more likely to promote laughter as a result of interactive games. The current research observed unstructured free time, an activity more conducive to laughter, whilst Agius' research elicited less laughter, perhaps due to the mealtime setting.

One way in which the present study differs from the related research is in terms of eye contact: this research recorded 11 incidences of eye contact, while Agius' research recorded almost three times this number, perhaps due to the current research outlining more limited parameters for eye contact than those used by Agius. This difference could be attributed to the stricter definition of eye contact used in this study. Agius (2009) did not

have the two-second prerequisite, and as a result it is likely that more instances of eye contact were coded.

With regards to the lower frequency of challenging behaviour (CB) observed in this study, particularly in the case of Tasan, who reduced CB after the intervention stage, this intervention effect has been supported by a number of previous studies, which cite communicative development as a key factor in the decrease of CB (Sigafoos, 2000; Whitaker *et al*., 2001; Clements, 2005; Kossyvaki *et al*., 2014). This suggests that Tasan might have found other ways of communicating. However, the occurrence of CB was well above the 1% figure given by Agius (2009), However, Agius considered CB as inclusive of tantrums, aggressive behaviour and injury but did not include violent outbursts, crying, shouting, and screaming; these behaviours were, however, considered CB in the current research.

Of the children who were observed during the pre-intervention stage as demonstrating pointing, all increased the frequency of this function after the intervention stage, possibly connected to commenting also increasing in frequency, as these two functions are related. Proximity or touch in the current research made up just 4% of all initiations, with a Cohen *d* effect of 0.56 (medium effect size), much less than the 12% increase recorded by Potter and Whittaker in their 2001 study. It is important to note, however, that the coded behaviours were not previously outlined in the latter study, but instead researchers noted the most commonly observed methods; these were pointing, re-enactment and physical manipulation. The two studies should, then, be compared with caution.

Use of symbols or pictures to communicate was higher post-intervention in all children, with a high 2.62 Cohen *d* effect, or 18 times on average, far higher than Chiang's (2009)

one in two hours. However, this may be largely due to the autism-specific setting, which places pictures at the forefront of interaction. The aforementioned study by Chiang pooled its sample from a number of schools, which meant a variety of preferred communicative styles (Chiang, 2009). Of the children participating in the present research, only Ali used gestures with any significant frequency, while all children made some regular use of PECS, except Albeshri who used single words rather than symbols/ pictures

The observed increase in use of symbols and pictures can be attributed to a tendency on the part of the adults to anticipate the child's desires before the intervention stage, attempting to guess at the child's needs before receiving a signal. This is a plausible explanation, as children were often observed choosing an image but not showing it to a member of staff before the intervention. After the intervention, children began approaching adults with pictures so that there was a two-way communication between them. Post-intervention, this reciprocal communication became more and more vital to fostering communicative initiation through a meaningful exchange of symbols and objects. This was most apparent during meals, as before the intervention children were served the entire meal, but after the intervention meals were served in one-quarter portions, which the child could then increase using symbols and/or pictures.

In terms of verbal communication, only one child demonstrated this both before and after the intervention stage. This was Albersi, who used simple words to suggest his needs and, post-intervention, began to build upon this with the aid of a teacher to create simple two-word sentences, e.g. moving from "food" to "want food."

6.10 The impact of adult interactive style on the spontaneous communication of individual children with autism

People with autism represent a heterogeneous population. Attempts to derive reliable research results from groups can therefore be misleading at times. As Happé *et al*. (2014) report, a focus on individual differences is an important research tool. This is especially so when considering the impact of interventions: an intervention may be effective for one child but not for others, and examination of characteristics of those children who benefit and those who do not can provide valuable information to guide staff decisions about implementation. As Happé *et al*. (*ibid*.) note, the heterogeneity of autism means that a single cognitive theory is unlikely to explain all aspects of autistic expression, and likewise a single intervention is unlikely to be beneficial to all people who share the label of autism spectrum condition.

The following section will present the discussion of individual findings for each child, along with details for frequency of initiation in each case; further details are available in *Appendix 20*. The reader should consider while reading these case studies that children with autism may follow typical developmental trajectories as regards the emergence of specific communicative functions but at a slower or different pace, or may have quite unusual individual developmental trajectories. Research on typical development of communications functions and ways in which these are often seen to differ in children with autism is presented in *Chapter 2*.

6.11 Discussion of individual results

The research provided contradictory findings concerning the effect of activities. The activities in which the largest effect size was observed post-intervention were Breakfast

and 1:1 work. This may be explained by assuming that the children found their structure and predictability more enjoyable. Furthermore, many children might find these particular activities more stimulating. It is possible that the comparatively lower number of communicative attempts seen during unstructured free play was influenced by the lack of structure and predictability, and the fact that rewards are less immediate. In the breakfast activity, tangible rewards of food and drink may be received, as well as social rewards, while in the 1:1 activity initiating communication with the adult may result in receiving an immediate tangible reward, such as a toy, or a social reward. This is not necessarily the case during unstructured free play.

In this research, the majority of children were fond of breakfast, and they also enjoyed doing their 1:1 work with staff. On the contrary, unstructured free play often required particular skills, for instance turn-taking, anticipation, and reading other people's minds in order to sustain interaction, and it is possible that such requirements influenced the spontaneity of their communication. Moreover, the principles that the participating staff members were to adopt were more similar to the work they were doing prior to the research (e.g. utilisation of non-verbal cues to achieve better understanding, minimal speech, etc.). On the other hand, unstructured free play involved using principles that the school curriculum did not include (e.g. responding to every communication attempt regardless of its 'appropriateness,' imitation, etc.).

In case of Ali and Albeshri, the post-intervention increase in CB might have been unrelated to the intervention. This is particularly the case for Albeshri: as noted in the case study, staff claimed that the child's parents stopped his medication after seeing he had improved, which probably influenced the research findings.

Previous research also provided contradictory findings concerning the impact of individual activities on communication attempts. According to some studies, structured activities stimulated initiations more often, whilst others claimed the exact opposite. In the study by O'Reilly *et al*. (2005) involving a 12-year-old autistic student who also had learning difficulties and no speech, the majority of communication attempts during academic activities occurred in the form of self-injury. Likewise, the sample Chiang (2009) used in her research – children with limited or no speech, 2.2 to 16.2 years of age – initiated communication more frequently during academic activities. Chiang (2008a) also revealed that in another sample – children and pre-adolescents with autism, 3.4 to 16.2 years of age – participants were most active in initiating communication (i.e. did not require cues of an intrusive nature) during lunch. On the contrary, Potter and Whittaker (2001) stated that their sample of children – participants with limited speech, two to six years of age – mostly initiated spontaneous communication during unstructured activities (i.e. burst and pause/rough and tumble games, imitation of the children).

Even though no large-scale discrepancies were observed during the process of comparing data obtained through three discussed methods (videos, interviews and field notes), there were still certain differences between what staff noticed and what could be observed in the video data. This confirms the relevance of the triangulation of research data, as comparison between data sets provided useful information and contributed to a more truthful picture when all data was considered together. It should be noted in this respect that all methods employed in this study were found to be reasonably accurate, with video observation being the method with the highest level of precision, particularly regarding the ability to record the moment in which communication was initiated.

The existing differences among various data sets can be explained through an array of factors, with the key factors being the limited knowledge of staff members concerning the style of communication preferred by a particular child, and the bias of the researcher. Such bias, it can be assumed, should not pose an issue for the current research given the fact that more than 20 percent of the videos were evaluated through inter-reliability checks. Regardless, it is clear that assessment of children and coding of their behaviour by an external person is very important.

CHAPTER 7: CONCLUSION AND META-ANALYSIS

This chapter presents conclusions gained from the study, specifically the research outcomes discussed in the previous three chapters, in relation to the aims of the primary research questions posed at the beginning of the study. Firstly, it includes a summary of the findings, beginning with those related to AISI, developed by Kossyvaki (2012). Secondly, it provides an overview of the findings related to the spontaneous communication element of the research, along with research methods employed, the research process, and factors that appear to have been important for achieving the results reported later in this chapter. This is followed by an examination of how this research fits into the existing literature, as well as, its implications for future studies in the field. Finally, key conclusions are summarised.

7.1 Conclusions regarding the use of AISI

The overarching research aim of the study was to learn whether it has an effect on childrens' initiation of communication bids when adults change their style of interacting with them. In this study, adults learned how to change their interaction style through a teacher training intervention that introduced AISI. Data was collected that captured both teacher and child behaviour, including verbal and non-verbal communication. Additional data was collected from interviews with staff, before and after the intervention, to explore their expectations, flexibility, and experience of implementing the intervention.

Following on from the main question, four sub-questions were posed, the answers to which would present the information needed to see whether the research aim was met. These were:

1. When adults change their interactive style, what differences can be observed in the frequency with which the children they work with initiate communication with others?

2. When adults change their interactive style, do children then also adopt different methods of initiating communication?

3. When adults change their interactive style, which activities lead children to initiate more communications?

4. To what extent are adults able to change their interactive style?

7.1.1 Conclusions regarding implementation of AISI

Findings were derived from all of the data collection and analysis methods implemented, including: video recordings coded with the AISCC checklist; data from observations captured using teachers' evaluation checklist and field notes; action research discussions captured in the field notes; and qualitative data from pre- and post-intervention semi-structured interviews. Analysis of data from all sources indicated that after the AISI intervention was implemented, the way in which teachers interacted with children changed significantly, and that children responded by initiating communication bids more often. Some activities, specifically 1:1 work and the breakfast activity, were found to produce more communication initiations from children after AISI was implemented than was the case during the unstructured play activity. No child adopted an entirely new method of

initiating communication, but the frequency, functions and methods of their communication changed significantly. For example, some children used less challenging behaviour and more of other forms of pre-linguistic communication, and others extended their use of symbolic or linguistic communication.

It can therefore be concluded that the aim of the research was met. It was found that in this study, when adults working in a special school changed their communication style in line with AISI principles, the children they worked with did increase the frequency and to some extent the form of their communication bids. This process was not necessarily observed to occur at every possible opportunity, as children's mood, intention and communication ability had an impact, as did the adult's skill, willingness to implement AISI principles, personality and mood, and the teaching situation. The study results also show clear evidence for the transactional nature of autism: when adults create communication opportunities in enabling environments, autistic children are more able to communicate.

The extent to which adults were able to change their interactive style was a sub-question for which particularly interesting results were returned. Participants more readily adopted elements of the intervention perceived as extending existing good practice, but needed additional support to implement some other AISI principles. Some staff were resistant to certain AISI principles, for example: imitation, due to cultural factors and personality.

7.1.2 Conclusions regarding teachers' use of AISI principles

The frequency of implementation of each AISI principle was recorded for each research phase. Implementation frequency of most principles changed positively between pre-intervention and post-intervention. The use of AISI principles and communication opportunities that were familiar to staff from other interventions or already used

occasionally at the Autism Centre, was more likely to increase. This adds credence to the concept that staff find it easier to build on existing good practice, so this principle should be incorporated into AISI training. Training procedures such as using video data and interviews with discussion every day during the practice to help staff identify existing good practice are a tool that is likely to help staff have the confidence to extend existing good practice.

Teachers found that some principles were more effective than others for the specific children they worked with, while certain other principles were less effective due to teachers' perception of difficulties regarding implementation. For example, contradicting the child's expectations, giving non-preferred items, and setting up situations where the adults intentionally 'forgot' something vital, were seen as difficult to implement for fear of upsetting the children. Teachers found that giving children materials they might need help with should also be used with caution.

'Withdraw attention' was an addition to the AISI toolbox deployed in this study. As with the other tactics that staff found challenging to use, the evidence suggests that staff will need additional preparation and support to use this principle effectively. This would be a good topic to take up in further cycles of action research, for example, during which staff could work together to plan situations where these principles could be used with minimal chance of disruption and a shared understanding of what the principle means and how to use it productively. Working together to plan use of these more challenging principles will also mean that staff give each other explicit 'permission' to try them, minimising the possibility of embarrassment or worry about seeming to lose control of childrens' behaviour if the child reacts badly. These concerns were an inhibiting factor for staff, so

finding ways to overcome them is important. Working with management to ensure that they also support changes that could cause temporary disruption would also help.

The researcher also observed teaching practice directly and completed a staff evaluation checklist during this process. The data recorded during these observations was then discussed after work with teacher on the same day, to support teachers in their AISI practice. Issues such as different definitions of AISI principles or limited understanding of how to use the principles in everyday practice emerged during these discussions, and were addressed when possible. The researcher believes that this immediate feedback was an important factor in the intervention's success as it reminded them of AISI principles while the day's work was still fresh in their minds. This practice encouraged reflexivity.

The success of the intervention is not particularly surprising (Kennedy, 2011) as each of the five teachers assessed for AISI implementation already had some proficiency in using some principles. The use of recorded video played back to teachers during the training period, to show them their existing good practice, and also after the intervention in order to affirm their progress, strengthened the process. This process, along with the action research discussions with teachers, are likely to have aided in the acceptance and long-term maintenance of AISI techniques.

Previously, some AISI principles were being implemented erratically, and training mostly focused on behavioural approaches When AISI presented different reasons for using such principles, this impacted how and when they were used. Staff acknowledged that they would like to use the principles more extensively, but felt a need for more practice to gain confidence using some AISI principles. This study differed from previous research on AISI

(i.e. Kossyvaki *et al*., 2012) in a number of ways, and it is likely that these affected the outcome. In Kossyvaki's study (*ibid*.), she worked with staff in a more democratic way that was centred on a focus group where staff and the researcher discussed implementing AISI. Due to the authoritarian nature of education facilities in Saudi Arabia, simply copying this method was not possible. As explained in previous chapters, staff were more reticent about making changes to practice on individual initiative, and felt restricted by precise remedial plans (IEPs) for children that were given to them by management at the Autism Centre, and by CCTV surveillance. The researcher needed to work closely with management, and to take on a more authoritative and didactic role to give staff 'permission' and more flexibility to improve practice significantly. This role included providing formal training sessions, and one-to-one meetings with teachers at the end of the days when their work with children was videotaped and observed.

Unlike Kossyvaki (*ibid*.), the researcher acted as an observer with minimal visible presence in the five classrooms where work took place, whereas Kossyvaki took part in everyday classroom activities with staff and children. The focus on being an observer rather than a participant during the staff's implementation of AISI was culturally appropriate: staff were accustomed to being observed by managers and outside experts which is more directive, and said they looked to outside experts for help in improving their practice. An active participant role would have placed the researcher on a more equal level with staff. In a British school like the one where Kossyvaki's study took place, this would have been a positive point. However, in an authoritarian school culture, this would be less likely to be effective. Although the aim of action research is to encourage staff to become confident, reflective practitioners, attention to workplace culture in research design is a key component in success. The researcher believes that in further cycles of action research, as

management acceptance and staff competence and confidence grow, research processes in a school that has had a highly authoritarian workplace culture could become more democratic. Using a focus group during later research cycles, for example, could help to create more teamwork and consensus amongst staff, and would be especially important if the staff group work in the same classroom. In this research, however, the five staff members were from different classrooms and the discussion with staff daily to reflect and improve their interaction.

Interestingly, some teachers had concerns about imitating the children, and using an animated voice and exaggerated body language. This was partly due to self-consciousness at being observed and/or filmed, suggesting that the principles each teacher decided to use depended not only on their views of the principle's effectiveness but also their personality, training and cultural background. Teachers with less confidence or insufficient training in developmental approaches were shy and self-conscious, and so were reluctant to use imitation, which may have affected practice. School culture may also have an impact. These factors should be considered when training teachers to implement AISI. Teachers expressed a need to see evidence, so providing evidence from other research, from videotapes of successful practice (preferably in a similar setting), and from small 'experiments' with changing practice in their own workplace would be most likely to support teachers in trying effective techniques that felt uncomfortable.

Another possible factor for a successful AISI was the action research process used. The research was developed by the teachers themselves along with the researcher. Accordingly, they felt that, rather than solely having their practice examined by an outside expert, they were working together to improve practice at their school, although as noted, there were

challenges to collaboration due to the workplace culture. Teacher's conscientiousness in implementing and assessing the implementation of AISI principles themselves was key to the success of this study and eased the process for all involved. A number of participants expressed that they enjoyed the collaborative aspects of the research, and felt professionally enriched as a result of their involvement. This echoes previous findings about action research in school settings (Koshy, 2005; Denscombe, 2010; Kossyvaki *et al*., 2012). Staff experience during the action research process reinforced the effectiveness of AISI. Teachers said they became more aware of their practice as a result of the observation and evaluation processes involved in the action research implementation. This lends support to the concept that even in an authoritarian school environment, action research can be effective when carefully designed to not challenge expectations too severely, and that it may contribute to beneficial changes in school cultures overall by gradually empowering staff with more flexibilty.

It is important to acknowledge these challenges to the action research process, however. The study findings revealed that teachers were more likely to actively participate when praised for their good practice by peers, during action research discussions that followed collaborative viewing of videos taken during their own pre-intervention practise. However, it was found that the hierarchical education system within the school where the research took place, and in Saudi Arabia generally, sometimes made it difficult for staff to fully collaborate with colleagues. They did not perceive themselves as having the freedom to make major changes in their practice. They felt constrained by meeting the very specific activity requirements set out by the administration in each child's remedial plan, by the presence of CCTV cameras in teaching areas, and in one child's case by restricted use of one communications method (PECS). Also, teachers were used to looking to outside

experts for advice and information about working with autistic children, and sometimes lacked confidence in their own ability to generate data and use this to change practice. The researcher's position as a teacher from Saudi Arabia who had developed expertise in working with children with autism, rather than an 'autism expert' from outside Saudi Arabia, helped to address these issues. Although the researcher was perceived by staff as having specialist knowledge and authority, he shared their language and culture, and had worked in a similar role. These commonalities helped to create a somewhat more equal relationship and comfortable rapport than might have been the case had the researcher been, for example, a senior academic researcher from the US or UK.

When empowered by management and experience, teachers demonstrated increased confidence in their ability to generate and evaluate data. Cooperation was encouraged through observation of videos and praise of their own good practice, as well as opportunities provided to discuss and reflect on practice during and after the action cycle.

Due to the teachers' hard work in extending good practice and implementing other aspects of AISI, teachers' knowledge and skills improved. This can contribute to wider changes in practice in the Autism Centre and in other special schools in Saudi Arabia, where teachers sometimes place too much emphasis on managing difficult behaviour, and lose track of the progress that is being made. In an education system where specialist equipment and training from outside experts can be hard to access, it is useful to have evidence of teaching practices that can be implemented by staff themselves, without additional costs, and that can be adapted for use with existing school activities, such as eating breakfast and working 1:1 with children.

The results of this research provide evidence that changing adult interactive style can have positive benefits for autistic children. A consideration of the number of instances AISI principles were used by teachers in this study reveals that each participant significantly increased their frequency of using most principles. Pre-intervention and post-intervention practice comparison showed an increase in practice with a Cohen's *d* effect size of 2.79, reflecting a clinically significant impact. More than 70% of the 13 general AISI principles and nine communicative opportunities were assessed as demonstrating a high effect size regarding staff practice change.

Although the school environment provided a good level of ecological validity for carrying out research, it also posed some challenges. Teachers experienced difficulties in implementing some AISI principles and strategies while teaching for several reasons, including: a shortage of dedicated time, an already busy schedule, forgetfulness, safety concerns, or fear of upsetting the child. For example, when children became upset, teachers could sometimes not keep appropriate proximity, and wait to give them the chance to communicate their feelings, as they felt the need to take direct action to ensure the physical wellbeing of the other children. Teachers were at times distracted by managing other children's demands and could not take extra time to use AISI strategies.

7.2 Conclusions regarding spontaneous communication

7.2.1 Frequency of spontaneous communication

Analysis of post-intervention video data demonstrated that incidences of spontaneous interaction rose after the intervention, reaching almost double the pre-intervention rates (from 322 initiations pre-intervention to 598 initiations post-intervention). This pattern was

also supported by data collected via other methods, including the post-intervention semi-structured interviews with staff, and the field notes from observations. The Cohen's *d* effect size comparing pre- and post-intervention spontaneous communication was 2.04; indicative of significant change.

The findings of this study are consistent with other studies of facilitating spontaneous communication through altering adult communicative behaviour during interactions with autistic children (Ingersoll *et al*., 2005; Ruble *et al.,* 2008; Kossyvaki *et al*., 2012). In which researchers similarly found that with changes in adult interactive style to deliberately elicit more spontaneous communication, autistic children increased their frequency of spontaneous communication. The work of McAteer and Wilkinson (2009), who employed a comparable methodology and research environment in similar pre- and post-intervention conditions, supports this most significantly.

This research recorded a particularly high rate of spontaneous interactions when compared to previous studies, such as those by Stone and Caro-Martinez (1990) and Chiang (2009), though not as high as those recorded by Clifford *et al*. (2010). These differing results can largely be attributed to a disparity in how the researchers choose to interpret 'spontaneous' communication initiation, as well as, differing methodologies and demographics.

An examination of video recording analysis findings found an increase in spontaneous communication between children and adults, similar to previous research findings (Hauck *et al*., 1995; Potter and Whittaker, 2001; Chiang and Lin, 2008), although the latter were not conclusive of whether an AISI increased these kinds of interactions, due to differing variables and measures of peer-to-peer communication and adults-to-children ratio.

7.2.2 Effect of type of activity

Due to the variables at play and the variations in the activities, determining which activities facilitated spontaneous communication most frequently is very difficult. After the intervention, breakfast time and one-to-one interaction were observed to have the most recorded instances, with unstructured play being the third highest when examining improvement by the number of individual spontaneous initiations, this order is completely reversed. This is most likely due to a divide between those who find more opportunity for contribution during one-to-one activities, and those who flourish during unstructured free play.

During post-intervention interviews and after-work discussions, staff indicated that breakfast and unstructured free play activities were the most effective for eliciting spontaneous communication. Comparing these results to those from several other studies, where some lauded the effectiveness of structured activities and others, unstructured activity, was largely due to the researchers' differing definitions of 'structured activities,' as breakfast in one setting may be very structured and adult-led, while in another setting it may be a more child-led activity (O'Reilly *et al*., 2005; Chiang, 2009; Potter and Whittaker, 2001). However, in Kossyvaki's (2012) previous study, unstructured activities and snack time were found to be the most effective activities for eliciting communication. Fuller details of activity delivery method in future studies would provide more precise comparative data.

7.2.3 Communicative functions

This research identified three distinct groups into which spontaneous communication behaviour could be subdivided forming three major categories of intention served by communicative acts (Prizant *et al*., 2000) namely: behaviour regulation (requesting and rejecting); joint attention (commenting/giving information, seeking information); and social interaction (expressing feeling, seeking attention, seeking approval, social routines and social games). Throughout the entire study, including the pre-intervention stage, requesting was the most frequently recorded behaviour overall (Cohen's d = 4.8), as supported by previous work by Potter and Whittaker (2001), Chiang and Lin (2008), Agius (2009), and Kossyvaki *et al*. (2014). Social interactions most used pre- and post-intervention were expressing feelings and seeking attention with social games. Behaviour regulation through requesting was also noted to have improved significantly post-intervention.

Research data substantiated that instances of emotional expression became more frequent after the intervention. The rise in these expressions, both negative and positive, is very likely to do with the added attention of teachers, their increase in receptiveness, and the introduction of unfamiliar communicative processes. While most studies and related literature have presented autistic children as emotionally uncommunicative (Dawson *et al*. 1990; Ozonoff *et al*., 1990) or capable of mainly negative expression, such as fear or anger (e.g. Bieberich and Morgan, 1998), this study (like Kossyvaki's study) indicates that the rate and nature of emotional expression by autistic children takes place in the context of interpersonal transactions, and is therefore affected by adult behaviour rather than being an expression of purely innate difference. Most studies that reported positive emotional expression have been in-situ studies with high levels of ecological validity, as these are

often the only studies which consider it as a measurable result (Stone and Caro-Martinez, 1990; Agius, 2009). These studies acknowledged the occurrence of emotional expression but stated that it was extremely infrequent. The discrepancies between these results and those recorded in this current study may be largely due to the use of video footage in this research, which ensures that behaviours are not overlooked by the researcher. For their part, staff did not always recognise emotional expression when it occurred. The post-intervention interviews confirmed this, as staff described some occurrences of children expressing feelings but did not define them as such.

In addition, many studies have not observed autistic children during play, instead observing them during lessons or meals, during which expressions of emotion are likely to be less frequent. The existing literature on this matter is not, however, entirely contradictory to this study; many have observed frequent expressions of emotion in autistic individuals. For example, Freeman *et al*. (2002) video recorded the behaviour of autistic students up to the age of 24 while they were communicating with a teacher, and found that the expression of emotion was the most commonly observed expressive function.

Students' attempts to introduce play and seek attention increased post-intervention, though the overall frequency of these behaviours was fairly moderate. Introducing social play was previously categorised as a 'requesting' behaviour, which should be adhered to in future studies if the results are to be comparable (Chiang and Lin, 2008; Chiang 2009). Attention-seeking activities, as mentioned above, increased post-intervention. This result was expected by the researchers, as this activity has been consistently recorded in previous studies, such as Stone and Caro-Martinez (1990). Commenting was limited, with

significant instances of this behaviour displayed by only three children. One could argue, in light of these findings, that the introduction of an AISI (or a similar set of techniques) may advance the existing social capabilities of the child rather than creating new capabilities.

During the research, there was some contradiction between data from video recordings and data obtained using other methods due to a lack of consistent definitions between researcher and teachers, and classroom distractions.

7.2.4 Communicative methods

In terms of the ways in which the children could exhibit communication, two wide categories emerged: pre-symbolic communication and symbolic communication. The data from the video recordings was analysed regarding each of these communicative methods. Changes were considered in relation to group means as well as individual instances of spontaneous communication.

Of all of the instances of spontaneous communication, pointing, vocalisation and simple motor action had the highest frequency post-intervention. Similar results were gained within research carried out by Stone and Caro-Martinez (1990) and Agius (2009). Apart the most verbally advanced child, who used single words to communicate, all of the students used symbols/pictures more frequently post-intervention. There is reason to believe that this can be attributed to the intervention and the alterations in staff communication style it ushered in. Pre-intervention, adults were much quicker to take the symbols from a child's hand. Post-intervention, staff were more aware that intent and a communicative partner are basic elements of communication, and that they should

therefore create communicative opportunities, wait for initiations and show availability to facilitate communication. Using these techniques allowed for the recognition and encouragement of different manifestations of communicative behaviour in order to facilitate spontaneous communication. This is exemplified by the rate at which children presented pictures or gestures for items, which doubled post-intervention. The child who used single words also increased his use of speech and gestures. This would indicate that symbolic communicative behaviours increase when these techniques are implemented, and also that verbal requests can be more actively encouraged, promoting speech development in children with speech limitations. In order to assert this more strongly, further research must be undertaken with this specific aim in mind.

7.3 Additional conclusions

In this section additional findings from the study are presented, such as those related to the research process itself.

7.3.1 Research process

Additional findings relate to the research methods used. Whilst useful to the research, the data collected via video recordings was limited because video recordings could not capture all interactions between the teachers and the children. Video was only recorded at certain times, and a single video camera cannot be placed in a location that easily captures young children in motion or all forms of non-verbal communication. Because the amount of video captured was limited, the coding of video data for teachers was also limited to 60 minutes per research phase. Findings from video recordings were, however, supported by other methods, such as data from direct observation by the researcher using teachers' evaluation

checklist, after-work discussions with staff recorded in field notes, and pre- and post-intervention interviews, in order to create the most in-depth picture possible of adult interactional styles before and after AISI teacher training intervention. It can be concluded that is it important in research of this kind to ensure that data collected via video recordings is triangulated with other forms of data collection.

The data derived from the video recordings, teachers' evaluation checklist and the field notes were relatively consistent with one another. There was one area where some difficulty occurred with the capture and coding of communicative functions. The methods used by the children to initiate communication, such as the use of symbols, words, or pulling an adult's hand, could be easily detected and coded. However, deciphering the function of a communicative behaviour was a much more complex process, in which the researcher and teachers had to decide on the intention of the behaviour without being able to ask the person communicating. As a result, unanimous agreement was not always achieved. For example, a child crying in response to a favourite toy being removed might be coded by one researcher as expressing emotion and by another as requesting their toy.

7.3.2 Comparison of findings with other research

It is difficult to compare and contrast the findings regarding communicative methods with those of previous studies, the way in which communicative methods are defined varies, with other studies delineating wider classifications of behaviour under a single term. For example, in the independent and collaborative work of Chiang, communication was divided into AAC (unaided), AAC (aided), and verbal communication. Another study divided communication, similarly, into motor, speech, gestures and vocalisation (Stone and Caro-Martinez, 1990). A number of other studies neglected to outline all methods

observed, or categorised, during the research, presenting only those communication categories that were most common in the study. In order to facilitate a comparison of studies, therefore, more specific definitions of the communicative methods studied are required, even if these were not observed. Findings have been compared with Kossyvaki's previous work in *Chapter 5* and *Chapter 6*, with similarities and differences duly noted.

7.3.3 Contribution of the study to the field

This study attempted to cover a number of research gaps highlighted in the Literature Review. Accordingly, the role of this research with regards to the existing literature is a complementary one, addressing some of the topics neglected by previous studies in the field and considering others in a new setting.

Although social communication in autistic children has been extensively researched, there are relatively few studies that focus on adult style and its role in developing communication. Chiang and Lin (2008) and Chiang (2009) report on the limited research carried out on the spontaneous communication of autistic children with limited or no speech. This study contributed to the understanding of how children's spontaneous communication can be affected when staff change their interactive style. It showed that by incorporating a small number of adult style principles in their practice, staff can enable autistic children to communicate twice as frequently, for more reasons, and using a variety of communicative methods. This study has explored working with children who are non-verbal or just beginning to use minimal verbal speech in a school setting, using an intervention applied during everyday teaching activities.

The research setting was also important. Many studies on communication have been carried out in laboratory or clinical settings, but there is a need for more research in real world settings such as schools and homes (Ogletree *et al*., 2002), as effects found in the former often do not translate into the real world (Kingstone *et al*., 2003); this study contributes to closing that gap.

Also, to the researcher's knowledge, no previous study in Saudi Arabia has focused on adult interactive style or AISI. This study produced data and findings which can be potentially transferred for use with children in other education settings in Saudi Arabia. The high level of ecological validity created in the research environment means that the results can be more easily applied in similar environments and in future studies.

Some researchers observe or interview participants to see what they do in practice or get their views on what they think they do (Potter and Whittaker, 2001). However, there is often a discrepancy between researchers and practitioners in terms of priorities and the implications for practice arising from research (Zeuli, 1994) and this should be taken into consideration. In the current study, the researcher actively involved staff to enable them to develop their current practice, and their contribution to this study was a very empowering and positive experience. During the course of this study, the researcher encouraged collaboration and communication between staff members, who were given a significant level of control over the process and actively encouraged to provide ongoing feedback during the research. This, one could argue, aided in the success of the study and allowed the participants to gain appreciation and consideration of their own work. As one participant said, AISI intervention *"from the beginning gave us room to look for how we can get better within a supportive environment and create more opportunity."* Another

staff member stated that *"we feel more confident and AISI gave us more flexibility in class and give us more creativity to facilitate the children which was the biggest challenge for teachers everywhere."* Establishing good relationships between the researcher and the researched is a challenge in real-world research. The researcher is wholly dependent on the goodwill and cooperation of teachers to gain data, and yet is often places demands on their time without any obvious gain. The researcher tried to make the experience as positive as possible for teachers and children involved, and felt that a very good working relationship was established. This is reflected in the fact that all the data required was collected over the period of time allotted for the study, and that staff have continued to use AISI after the end of formal research.

It is vitally important to have an appropriate learning environment for autistic children. As autism is characterised by difficulties with interpersonal communication, how adults communicate with children with autism is key if we are to focus on fostering the children's spontaneous communication. This requires moving beyond the behavioural approaches that have dominated teaching practices in Saudi Arabia, including in the Autism Centre where this research took place. Developmental/relationship-based approaches provide a different paradigm, one that is more likely to involve child-led activities, using approaches and tools that can be adapted to the needs of specific children. One of these tools is adult communicative behaviour, which in this study has been shown to promote children's spontaneous communication when it is adjusted to do so. Staff were able to change their interactive style to at least some extent, and achieved positive results. Staff were able to see these results because of how the action research had been designed by teachers and the researcher, further motivating them to change and improve their practice. The results of

this study support the need for staff in Saudi Arabia (and elsewhere) to receive sufficient training in AISI. It was found that staff responded particularly well when given the opportunity to improve existing good practice, and that receiving feedback on the same day helped to encourage further change. Although there were barriers to working collaboratively, staff responded to the opportunity to participate actively in this action research project, and doing so gave them 'ownership' of the results, further encouraging long-term implementation and further cycles of informal action research within the setting. Staff have gained skills that can help them move towards being more reflective and collaborative practitioners.

7.3.4 Limitations of the study

Despite the researcher's efforts to ensure the validity and scope of the study, there are some limitations present in the methodology of this research. The sample size of the children observed was limited, which means that the results cannot be used to make universal or generalisable conclusions. However, this was not the primary objective of the research. The objective was to employ AISI in an Autism Centre and assess the effectiveness of AISI principles in facilitating spontaneous communication, as well as assessing its usability in terms of its adoption by teachers. Despite the small sample size, insights have been derived from this research that can inform practice in other settings.

Only one child and one staff in each class of children were available to take part in the research in the Autism Centre, and there were variations between these children in social and communicative skills. The absence of a control group with which to compare the findings also disadvantages the study, as a control group would have provided a further check on the validity of the results. Unexpected variables, such as changes in home life,

growing maturity, and outside influences on the child, can often skew research results, and a control group would have aided in identifying anomalous results.

A randomised controlled trial can also aid in determining generalisability and the relationship between results; during this process, individuals are randomly assigned to the control or study population (Cohen *et al*., 2007). It is important to note, however, that it would have been difficult to implement a randomised controlled study as there wasn't a testable framework until the intervention stage, at which point a control group wouldn't have been useful. As the AISI framework has now been established in two countries (via one study conducted in the UK and the current study in Saudi Arabia), it can now be used in an RCT design by other researchers.

Another issue was the manual coding of the videos. Although coding the videos manually appeared to be the best option at the time of data analysis, this could have perhaps been done more efficiently. After finishing the analysis, I discovered a piece of audio and video annotation software called ELAN (2012). After downloading ELAN, the researcher can import a template (i.e. coding scheme) and the video footage that they wish to code. The main advantage of this software compared to manual coding is that it enables the researcher to easily identify the starting and ending point of each behaviour, so that the duration of the behaviour is clear. In addition, the annotations are time-aligned with the videos and are displayed below the video whilst it is playing. Use of this software enables multiple coding, increasing the accuracy of the data. The researcher would recommend use of this or similar software by future researchers undertaking similar work.

7.3.5 Implications for further research and practice

The following sub-sections discuss what the results of this study suggest in terms of directions for further research and further practice improvements.

7.3.5.1 Implications for research

This current stream of research is fairly new, and evidence of effectiveness, although emerging, is still limited. Several aspects of the study need to be considered further, and explored with different kinds of children and in different settings. It is therefore suggested that the findings of this study be built upon through additional research.

7.3.5.2 Implications for further research of AISI as a method of intervention

Further exploration is required into how each of the variables relate to one another. This can be introduced gradually via continuing cycles of this action research in the same setting, or in other settings. Those elements of spontaneous communication not present in this study due to time and resources limitations also need to be addressed, as do inconsistent findings between methods.

Replication of the research design must be considered, through randomised controlled trials, for example, with a larger sample of participants, as recommended by the What Works Clearinghouse (WWC, 2003b, cited in Odom *et al.*, 2005), to test the effectiveness of AISI more rigorously and to produce more widely applicable results. This should be done with different sample groups such as: older children or children with higher cognitive function; and later perhaps, with staff working in inclusive schools who have no prior experience of working with autistic children.

7.3.5.3 Implications for further investigations into teacher training

The most useful elements of the study were collaboration and assessment/reflection. This encouraged active development and improvement among staff, particularly when aided by viewing videotaped evidence of their own good practice. Issues requiring further investigation involved taking the opinions and experience of education staff into consideration when designing an AISI. This specifically involved investigating strategies such as listening, and providing support to staff during the action research cycle motivating continued practice despite barriers and constraints; and identifying and addressing barriers to teachers' use of certain AISI principles due to constraints of school policy, surveillance of staff, and cultural issues, which were outside the scope of the study. Sub-areas for future investigation include finding ways to boost staff confidence when using principles they may find uncomfortable; considering staff views on discrepancies seen in data from different sources (e.g., questionnaire, focus group interviews); and studying the impact of longer term use of the AISI intervention at the Autism Centre after further cycles of action research generate additional experience and reflection.

The researcher is aware that staff have continued to use AISI after the end of the action research cycle. Formal data-collection regarding outcomes and the factors that make it possible for successful interventions to continue long-term despite workplace and staff changes would be of great interest.

7.3.5.4 Implications for further investigations into parent involvement

Parents could be involved in future studies of AISI to facilitate consistency and to increase generalisation of spontaneous communication. Implementing some AISI principles also

poses significant challenges for the families of autistic children. The principles most challenging for parents may be quite different from those that were most challenging for teachers. It is envisaged that there will be some restrictions due to cultural beliefs and practices surrounding autism, and parenting. A whole-school AISI approach involving parent support and extra-curricular activities should be considered to encourage an inclusive wider educational community.

The research findings indicate that the implementation of new classroom methods should be discussed with everyone involved in the child's education, including the administration, teaching staff and parents of children. This will allow for the identification of any previously undetected problems that the new methods may cause. Allowing parents to view video footage of their own interactions with their child would also be effective and useful. It would also be beneficial to replicate similar study designs in schools in other Saudi cities to look at the impact of geographical, cultural and socio-economical influences.

7.3.5.5 Implications for future practice using AISI as a method of intervention

The study findings clearly indicate that AISI intervention is effective. However, they indicate that some minor adaptations to AISI, AISI training, and staff support may be needed to ensure it is comfortably accepted and used by teaching staff in schools across Saudi Arabia. Other schools working with autistic children in Saudi Arabia can be encouraged to replicate the AISI design for evidence of its success, with staff awareness and training facilitated through collaboration with teachers who took part in the Autism Centre action research cycle, as they are now an excellent local resource regarding AISI.

Further research is needed on provision of strategies and support to prevent administrative overload, to encourage more mindfulness during collaboration, to improve overall effectiveness of practice and staff confidence in their work by balancing the focus between children's development, and to contribute to ongoing staff development. Researchers should consider strategies like setting up staff forums to identify shared challenges and receive ongoing support, and using classroom video recording for internal peer discussion to facilitate positive staff self-improvement as a long-term strategy, not just during the action research project. As noted, these processes can be challenging in authoritarian school environments, but with careful implementation they may actually contribute to giving teachers increased confidence to take initiative, collect data, and change practice.

7.4 Summary

In this chapter, significant conclusions arising from the analysis of the data have been outlined and assessed. To summarise, the primary findings of the research suggest that overall, AISI can be adopted easily by adults working with children in an education environment. Implementation of these new techniques resulted in an increase in the frequency of spontaneous communication during and after the intervention stage.

The changes did not involve a complete transformation of behavioural patterns, but a rise in the frequency of children exhibiting positive communicative behaviours that they had previously exhibited. There was a strong impact on initiation of spontaneous communication by the children, which was the focus of the research. Despite the numerous successes of this research, there was no strong link observed between the nature of the activity and the rate/style of interaction, although more structured activities appeared to

somewhat more conducive to spontaneous communication.

The action research design sought to involve the participants as colleagues working towards a shared goal, rather than being directed by an "expert" from outside. By necessity, the researcher had to play a dual role to encourage staff to collaborate as much as they could. Collaboration and shared thinking about the problems to be solved was essential for the study, and could only be achieved through empowerment of the participants to *"develop ideas and speak more widely on the issues raised by the researcher"* (Denscombe, 2010: p. 156). I therefore needed to be explicit about the nature of my role, while not undermining their confidence in me as someone with something useful to bring to their busy work lives. The results show that this approach was effective, enabling staff to make significant changes in their communicative behaviour. Additional findings regarding minor discrepancies between data sets underlined the importance of using extra measures to check data accuracy, as was done during this research.

Important findings can also be derived regarding ways of making staff training for an AISI more effective. Staff were more likely to increase the use of AISI principles and communication opportunities that they were already somewhat familiar with. Therefore finding ways to identify existing good practice and use this information as a platform on which to build improvements should be incorporated into AISI training, as was done in this research by analysing video of staff working with children before the intervention.

The possibility that staff might define some principles differently from the researcher also emerged. This can be addressed in staff training by providing more real-world examples of using the principles with children like those the staff are working with, or better yet through modeling their use directly. This will also satisfy the need that staff expressed in

the pre-intervention interviews for evidence-based practice and "seeing results with their own eyes." Regular collegial discussions with staff about implementing AISI also helped ensure that staff understood more about what they were doing and its impact.

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APPENDICES

APPENDIX 1: CHECKLIST FOR THE INITIATION OF COMMUNICATION IN CHILDREN WITH AUTISM (CICCA)

Functions/ Means of Communication	Behaviour Regulation		Joint Attention		Social Interaction					Unclear
	Request	Reject/ Protest	Comment/ Give information	Seek information	Express Feelings	Seek Attention	Seek Approval	Social Routines	Social Games	
Pre-symbolic means										
CB										
Eye Contact										
Eye Pointing										
Laughing										
Pointing										
Proximity/Touch										
Reenactments										
Simple Motor Actions										
Smile										
Vocalisations/ Babbling										
Other:										
Symbolic means										
Delayed Echolalia										
Immediate Echolalia										
Object of reference										
Single Words										
Signs/Gestures										
Symbols/ Pictures										
Word Combinations										

APPENDIX 2: DEFINITIONS FOR COMMUNICATIVE FUNCTIONS AND METHODS USED IN CICCA

Functions

Behaviour Regulation	**Communications using speech or gestures to influence the behaviour of others** (Wetherby and Woods, 2006).
Request	The child asks for an item, for assistance or for an activity to occur (Stone and Caro-Martinez, 1990).
Rejection/protest	The child rejects an item that has been offered, opposes/refuses an activity indicates a desire to stop an activity that has already begun or alter an activity (Stone and Caro-Martinez, 1990).
Joint Attention	**Using speech or gestures to draw the attention of others to an item, an activity or another person** (adapted from Wetherby and Woods, 2006).
Give information or make a comment	Using speech, gestures, or signs the child indicates a comment about people, activities, or items that are evident to the listener or which are concerned with past or future events (adapted from Stone and Caro-Martinez, 1990).
Seek information	The child expresses a desire for information about current activities, about items that are evident to the listener, or which are concerned with past or future events (adapted from Stone and Caro-Martinez, 1990).
Social Interaction	**Using speech or gestures to draw the attention of others to oneself** (Wetherby and Woods, 2006).
Expressing feelings	The child shows his feelings and preferences regarding an issue or item (adapted from Stone and Caro-Martinez, 1990).
Seeking attention	The child trys to attract the attention of another person (Stone and Caro-Martinez, 1990).
Seeking approval	Using speech or signs to request permission to do something (adapted from Agius, 2009).
Social routines	The child performs a common routine such as greeting [SalamAlikum or Marahba)(kaifhalk)l [bye-bye] or makes a gesture [waving or shaking hand] (Stone and Caro-Martinez, 1990).
Social games	The child performs/initiates a social game such as hide-and-seek or racing (adapted from Kossyvaki, 2010).

Methods

Pre-symbolic methods	**This entails the child seeking to manipulate a person or item by using motoric or pre-symbolic behaviour** (Prizant et al., 2006).
Challenging Behaviour	The child Acts in a hostile manner which may endanger the child or others [e.g. hitting, kicking, throwing objects, pinching, self-harm] (adapted from Agius, 2009).
Eye contact	The child maintains direct and deliberate eye-contact for two seconds or more (adapted from Agius, 2009).
Eye pointing	The child uses his/her eyes to indicate a request. The child looks back and forth between an object and the other person until the child is given the object
Laughing	The child uses laughter in the presence of others to express positive emotions (Agius, 2009).
Pointing	Using a finger or hand the child points to an object or touches it. This may express a desire to go to the object, to have the item, or to draw attention to something (adapted from Stone et al., 1997).
Touching/physical proximity	the child may touch or embrace a person, or by transferring an item towards another person (adapted from Prizant et al., 2006).
Re-enactment, repetition	The child repeats an activity. For instance, by hiding and possibly by vocalising 'hide' the child seeks to re-enact a game. (Prizant et al., 2006).
Basic gestures and motor actions	This may entail jumping, clapping, pushing/pulling an object or person, throwing, hiding self or objects, running away etc. (adapted from Prizant et al., 2006).
Smiling	the child may smile at a person, at a pleasurable experience, or at an object (Agius, 2009).
Vocalising or babbling	Vocalising may involve the sustained production of sounds [usually vowels] possibly with varying pitch and volume. Babbling entails the repetition of combinations of consonants and vowels (Adapted from Kossyvak,2010).

Symbolic Behaviour	**The child makes use of speech, signs, symbols, pictures, or sign language to communicate** (Prizant et al., 2006).
Immediate echolalia	The child immediately repeats the words used by others (Prizant et al., 2006).
Delayed echolalia	After an interval the child repeats speech/sounds used by others (Prizant et al., 2006).
Items of reference	This form of communication involves the child touching an object which may indicate his/her wish [for example, a glass or cup may indicate a request for a drink. Wearing shoes may indicate his/her request to go out
Single words	The child may use a word (such as 'Abgha' or "Aba" which means I want) to express a need or wish. That sound may be recognised only by a person who closely knows that child, and the words are meaningful within a particular context.
Signs/gestures	Learned gestures or signs may be used to express a need, wish, or emotion (Examples include Makaton and sign language) (modified from Agius, 2009).
Symbols/ pictures	In this form of communication, the child may use learned symbols or pictures as normally used PICS in Autism centre (modified from Prizant et al., 2006).
Multiple words	The child may use/repeat several words, either correctly or incorrectly ("aba hamam" which means request Toilet). The words may possibly only be recognised by someone who knows the child well and knows his/her signs and speech. The words are usually more recognisable in the appropriate context.

APPENDIX 3: ADULT INTERACTIVE STYLE CODING

CHECKLIST

General principles	Tallies	Frequencies
1. Gain child attention		
2. Establish appropriate proximity		
3. Show availability		
4. Wait for initiations		
5. Respond to communicative attempts		
6. Assign meaning to random actions or sounds		
7. Imitate the children		
8. Follow children's lead/ focus of attention		
9. Use exaggerated pitch, facial expression, gestures and body language		
10. Use minimal speech		
11. Provide time to process information		
12. Expand on communicative attempts		
13. Use non-verbal cues		

Communicative opportunities

Communicative opportunities	Tallies	Frequency
1. Offer choices		
2. Stop part way		
3. Give small portions		
4. Make items inaccessible		
5. Give material they will need help with		
6. Contradict expectations		
7. Give non preferred items		
8. 'Forget' something vital		
9. Withdraw attention		

APPENDIX 4: STAFF EVALUATION CHECKLIST

	Not at all	1-5 times	Many times
1. Gain children's attention			
2. Establish appropriate proximity and contact			
3. Show you are available to the children			
4. Wait for initiations			
5. Respond to the children's attempts to communicate			
6. Assign meaning to the children's apparently random actions or sounds			
7. Imitate the children			
8. Follow children's focus of attention			
9. Use exaggerated pitch, facial expression, gestures and body language			
10. Use minimal speech			
11. Provide time			
12. Expand on communicative attempts			
13. Use non-verbal cues			
Communicative Opportunity			
1. Give a choice of activity, equipment or food			
2. Stop part-way through an activity or social interaction			
3. Give small portions (so children can ask for more)			
4. Make items inaccessible (so children have to ask for them)			
5. Give children materials that they will need help with			
6. Contradict children's expectations			
7. Give children known non-preferred items			
8. Set up a situation where you 'forget' something vital			
9. Withdraw the child attention			

APPENDIX 5: EASE OF UNDERSTANDING AND IMPLEMENTING AISI PRINCIPLES CHECKLIST

General principles	Easy to Understand	Difficult to Understand	Easy to Implement	Difficult to Implement
1. Gain children's attention				
2. Establish appropriate proximity and contact				
3. Show you are available to the children				
4. Wait for initiations				
5. Respond to the children's attempts to communicate				
6. Assign meaning to the children's apparently random actions or sounds				
7. Imitate the children				
8. Follow children's focus of attention				
9. Use exaggerated pitch, facial expression, gestures and body language				
10. Use minimal speech				
11. Provide time				
12. Expand on communicative attempts				
13. Use non-verbal cues				

Communicative Opportunity				
1.Give a choice of activity, equipment or food				
2. Stop part-way through an activity or social interaction				
3. Give small portions (so children can ask for more)				
4. Make items inaccessible (so children have to ask for them)				
5. Give children materials that they will need help with				
6. Contradict children's expectations				
7. Give children known non-preferred items				
8. Set up a situation where you 'forget' something vital				
9. Withdraw the child attention				

APPENDIX 6: PRE-INTERVENTION INTERVIEW SCHEDULE

INTERVIEW SCHEDULE	
Recording of interview	I would like to record our conversation? Is that acceptable to you? (Explain confidentiality / anonymity) Name:* Year of Experience:
Knowledge and understanding	1. Could you tell me a little bit about your experience of working with children with autism. *(Seek information about years of service, number of students, types of students)* 2. Would you describe the main characteristics of autism in the children you have worked with? 3. What personal qualities do teachers need in order to work effectively with children with autism? 4. What teaching skills do teachers need to work effectively with students with autism?
Training (initial training and ongoing training)	1. What training did you undertake before commencing working with children with autism? That is, where did you train, for how long, and what were the subject studies? 2. Communicating with children with autism can be challenging. Did you undertake any pre-service training in regard to methods of communication? (*(Seek to identify whether there was sufficient attention to methods of communicating with autistic children).* 3. If yes, how have your teaching methods changed as a result of that training? 4. What specialist support is available to help you enhance your teaching and communication methods? 5. Do you think that you require further training in new or different methods of communicating?

Attitudes	1. How do you generally feel about having students with autism in your classes? 2. How have you attitudes to children with autism changed in recent years? *(Awareness of educational changes).* 3. How can adults influence the communication abilities of children with autism? *(Obtain information about the teacher's attitudes to using different teaching approaches)* 4. In time, teachers develop their own particular ways of communicating with autistic children. Is it realistic to expect experienced teachers to adopt completely new ways of communicating with their students? *(Identify the professional flexibility of the teacher).* 5. Do you think newly qualified teachers, who have recently completed their training, have attitudes and expectations about their capacity to help the children communicate that differs from experienced teachers?- 6. What motivates you to work with children with autism?
Practice	1. Are you aware of any specific teaching methods and intervention for children with autism? 2. What kind of teaching methods and intervention do you use with your children? 3. What methods do you use communicate with your students? 4. If a child with autism does not communicate, what do you usually do to help him commence communicating? Can you give me an example? 5. If possible, children should be able to initiate a communication or an interaction. What techniques are most effective for encouraging students to commence a communication? 6. Have any of your current or past students developed the ability to initiate any forms of communication with you? 7. If so, in what situations are they most likely to try to initiate a communication with you? 8. That is, are there any activities or circumstances when they are most likely to commence interaction with you?

Changes / developments	1. What improvements in facilities for children with autism would you like to see in your school? 2. What kind of training would you like to have to improve your practice? 3. What changes or developments in the communication style used would better help children with autism? Need prompt 4. It is important for teachers and parents to work collaboratively to enhance children's ability to initiate communication. What strategies might help improve that level of collaboration? 5. Are there any areas of research, which might be explored to develop better ways to help children initiate interactions?
Barriers and needs	1. Regarding these possible changes and developments, are there are any barriers to making such changes? Can you tell me in more details? 2. Attitudes and beliefs about teaching methods can become fixed in teachers and other staff. Are there any strategies you can suggest which can help change attitudes? 3. Sometimes there are barriers, which inhibit collaboration between teachers and the parents/families of children with autism. How might those barriers be removed? 4. Sometime there are barriers to teachers adopting new methods for encouraging children to initiate communications. How might those barriers be removed?
Attitude to changing practice	1. Are you satisfied with your current methods for teaching children to communicate? 2. Would you be interested in adopting (or experimenting with) new methods focusing on your own interactive style to encourage children to initiate interactions? 3. We all tend to continue with practices with which we are familiar, and very often we resist change. What would convince you to try new methods for helping children initiate communication and change your own interactive style? 4. In order to help children communicate, do you see avenues or opportunities for working more closely with parents, and how might that be achieved?

*** Are there any things else you would like to mentions or ask.**

Post-intervention Interview Schedule

1. Do you believe that interactive style influences the communication capability of the children with autism?

2. Was it easy to change your interactive style after implementing the AISI program?

3. Was it easy for you to use these principles in your everyday practice? Were there any principles that you consider effective but you couldn't implement as much as you like to? If yes, which ones and why?

4. Are there any principles that you were not using before the intervention and you now use a lot? Why you were not using it/them before?

5. How frequently, in your opinion, do children with autism initiate communication when adults change their style of interaction?

6. Have you noticed any changes since the Adult Interactive Style I program was introduced at this centre?

7. Which situation do you believe will prompt a child to start communicating?

8. What is the most effective way to increase the initiation rate?

9. In your opinion, how effective are the proposed principles changes in terms of implementation and practicability?

10. Did you have any difficulties in understanding the proposed AISI principles? If yes, which principles and what kind of difficulties?

11. Are there any principles that you don't feel confident with?

12. Which principles of interaction do you rate as most effective, and why?

APPENDIX 7: DATA FROM STAFF EVALUATION CHECKLIST

Principles	Haskoor	Yousef	Alahadal	Wedyan	Olfat
1-Established appropriate proximity/contact	M	M	M	M	M
2- Show availability	M	M	M	M	M
3-Gain attention	M	M	M	M	M
4-Assign meaning to random actions or sounds	F	F	N	F	F
5-Imitate the child	F	F	N	N	M
6-Respond to all communicative signals	M	M	M	M	M
7- Wait for initiation	M	M	M	M	M
8-Follow the child's focus of attention	F	F	M	N	F
9.Use exaggerated pitch, facial expression, gestures and body language	M	F	F	M	M
10-Use minimal speech	M	M	M	M	M
11-Provide time to process info					
12-Expand on child's communicative attempts	M	M	M	M	M
13-Use non-verbal cues	M	M	M	F	M
Communicative opportunities					
1-Offer choices	F	F	M	F	F
2-Stop part-way	F	F	F	F	F
3-Give small portions, give materials they will need help with	M	F	F	F	F
4-Contradict expectations	N	N	N	N	N
5-Give non-preferred items	F	N	F	F	N
6-Withdraw attention	N	F	M	N	N
7-Forget something vital	F	F	N	N	N
8-Give materials they will need help with	M	F	F	F	F
9- Make item inaccessible	M	M	M	M	M

APPENDIX 8: DATA FROM POST-INTERVENTION INTERVIEWS
Teacher ratings based on their experience of using the AISI

	Teacher Ratings (on 1–5 scale) 5=more effective 1=less effective				
General Principles	**Haskoor**	**Yousef**	**Wedyan**	**Alahadal**	**Olfat**
1.Establish appropriate proximity/contact	4	4	4	5	5
2.Show availability	4	4	5	5	5
3.Gain child's attention	5	5	5	5	5
4.Wait for initiations	5	5	5	5	5
5.Responds to all communicative attempts	5	5	5	5	4
6.Imitate the child	3	4	2	4	5
7.Assign meaning to random actions or sounds	2	2	2	3	2
8.Follow child's lead/focus of attention	5	5	4	4	4
9.Use exaggerated pitch, facial expression, gestures and body language	5	5	5	5	5
10.Use minimal speech	5	5	5	4	5
11.Provide time to process information	5	5	5	5	4
12.Expand on communicative attempts	5	5	5	5	5
13.Use non-verbal cues	5	5	4	5	5
Communicative Opportunity					
1.Offer choice	4	3	5	3	3
2.Stop part-way	3	4	3	3	3
3.Give small portions	5	4	5	5	4

4.Make items inaccessible	*4*	*3*	*4*	*4*	*4*
5.Give material the child will need help with	*5*	*4*	*3*	*3*	*4*
6.Give non-preferred items	*3*	*3*	*2*	*3*	*4*
7.Withdraw attention	*3*	*3*	*3*	*4*	*3*
8.Forget something vital	*4*	*3*	*4*	*4*	*3*
9. Contradict expectations	*1*	*2*	*1*	*2*	*2*

APPENDIX 9: APPLICATION FOR ETHICAL REVIEW

UNIVERSITY OF BIRMINGHAM
APPLICATION FOR ETHICAL REVIEW

Application for Ethical Review ERN_12-1115

Who should use this form: AP9M-777-CP7E-B81A-FC5A

This form is to be completed by PIs or supervisors (for PGR student research) who have completed the University of Birmingham Ethical Review of Research Self Assessment Form and have decided that further ethical review and approval is required before the commencement of a given Research Project.

Please be aware that all new research projects undertaken by postgraduate research (PGR) students first registered as from 1st September 2008 will be subject to the University's Ethical Review Process. PGR students first registered before 1st September 2008 should refer to their Department/School/College for further advice.

Researchers in the following categoriesare to use this form:

1. The project is to be conducted by:
    - staff of the University of Birmingham; or
    - a research postgraduate student enrolled at the University of Birmingham (to be completed by the student's supervisor);
2. The project is to be conducted at the University of Birmingham by visiting researchers.

Students undertaking undergraduate projects and taught postgraduates should refer to their Department/School for advice.

NOTES:

- Answers to questions must be entered in the space provided – the beginning of an answer field will be indicated by a grey bar ( ).
- Use the up and down arrow keys to move between answer fields; use the side scroll bar to navigate around the document.
- An electronic version of the completed form should be submitted to the Research Ethics Officer, at the following email address: aer-ethics@contacts.bham.ac.uk. Please **do not** submit paper copies.
- If, in any section, you find that you have insufficient space, oryou wish to supply additional material not specifically requested by the form, please it in a separate file,

clearly marked and attached to the submission email.

- If you have any queries about the form, please address them to the Research Ethics Team.

UNIVERSITY OF BIRMINGHAM APPLICATION FOR ETHICAL REVIEW	*OFFICE USE ONLY:* Application No: Date Received:

1. TITLE OF PROJECT

Adult interactive forms of intervention on the spontaneous communication of young boys with autism in Saudi Arabia.

4. THIS PROJECT IS:

University of Birmingham Staff Research project ☐
University of Birmingham Postgraduate Research (PGR) Student project ☒
Other ☐ (Please specify):

5. INVESTIGATORS

a) PLEASE GIVE DETAILS OF THE PRINCIPAL INVESTIGATORS OR SUPERVISORS (FOR PGR STUDENT PROJECTS)

Name: Title / first name / family	Dr Karen Guldberg
Highest qualification & position held:	Senior Lecturer
School/Department	Education
Telephone:	
Email address:	

Name: Title / first name / family	Dr.Kerstin Wittemeyer
Highest qualification & position held:	Lecturer
School/Department	Education
Telephone:	
Email address:	

b) PLEASE GIVE DETAILS OF ANY CO-INVESTIGATORS OR CO-SUPERVISORS (FOR PGR STUDENT PROJECTS)

Name: Title / first name / family	
Highest qualification & position held:	
School/Department	
Telephone:	
Email address:	

c) In the case of PGR student projects, please give details of the student

Name of student:	Mr. Abdullah Basulayyim	Student No:	
Course of study:	PHD	Email address:	
Principal supervisor:	Dr. Karen Guldberg		

Name of student:		Student No:	
Course of study:		Email	
Principal supervisor:			

6. ESTIMATED START OF PROJECT

Date: December 2012

ESTIMATED END OF PROJECT

Date: March 2013

7. FUNDING

List the funding sources (including internal sources) and give the status of each source.

Funding Body	Approved/Pending /To be submitted
Government Of Saudi Arabia (King Abdul Aziz University)	Approved

If applicable, please identify date within which the funding body requires acceptance of award:

Date:

If the funding body requires ethical review of the research proposal at application for funding please provide date of deadline for funding application:

Date: NA

8. SUMMARY OF PROJECT

Describe the purpose, background rationale for the proposed project, as well as the hypotheses/research questions to be examined and expected outcomes.This description should be in everyday language that is free from jargon. Please explain any technical terms or discipline-specific phrases.

Children with severe levels of autism are characterised by a limited ability to communicate both verbally and in other ways; also, they often have difficulties in initiating communication with either adults or other children. Since autism was first defined there has been extensive research seeking to identify techniques by which children can be assisted to communicate. In recent years there has been an increasing focus on a more interactive style of teaching which aims to enable children to initiate communication bids. This is an important milestone skill for all children because it enables them to express their needs and can empower them to take greater control of their lives.

The problem being addressed in this study is how to provide better support to young children on the autism spectrum in order to develop their social communication skills and to support them to communicate with others. In particular, their ability to initiate spontaneous communication needs to be supported.

A number of different approaches to this problem have been used over the years. However, results have been mixed, and no 'best' approach has been established. Recent work has nevertheless demonstrated that when adults (parents and teachers) modify their own interactive style when working with children on the .autism spectrum, this can have a positive influence on the child's capacity to initiate communication. In essence, the adults use strategies that encourage children to initiate exchanges.

Five research questions will be addressed in this investigation:

1. When adults change their style of interacting with children does this lead to a difference in the way children initiate communication bids?
2. When adults change their interactive style, can differences in the frequency with which those children initiate communication with others be observed?
3. When adults change their interactive style do children then adopt different methods of initiating communication?
4. When adults change their interactive style which activities lead children to initiate more communications?
5. To what extent are adults able to change their interactive style?

The expected outcome of this study is that teachers will be able to adopt interactive styles which will be more conducive to assisting children on the autism spectrum to spontaneously initiate communications with others.

9. CONDUCT OF PROJECT

Please give a description of the research methodology that will be used

This research will be conducted in Jeddah, Saudi Arabia, in a school which caters for children on the autism spectrum. This will be an action research case study employing both quantitative and qualitative data. The sample will comprise six to eight teachers and about eight children aged 5-8 years. The participating children will be assessed to confirm their diagnosis and to ensure that they are of comparable levels of functioning. The methodology will consist of the following steps:

- Recruiting eight teachers who work with children on the autism spectrum, and explaining the background and rationale for the project.
-Staff will be interview individually on their current practice and priorities in working with children with autism.

- Baseline data will be established by video recording current pre-determined classroom activities in order to identify and document existing patterns of communication between adults and children. To obtain an adequate sample of interactions each child will be video recorded while participating in a number of different activities. It is expected that the initial video recorded sessions will be of about two hours duration.

- The video recording will include teachers in order to provide baseline information about their interactive style with each child.

- Using the recordings, an analysis will be made of the frequency and form of communications between teachers and children. These data will constitute the baseline information.

- Staff will then be instructed in the application of a number of strategies which form the basis of the intervention protocol.

- For a period of three months, staff will aim to adopt the strategies outlined in all their interactions and communications with the children.

- The researcher will conduct discussions with staff to review the effects (if any) of the strategies on the quality and frequency of the children's communication bids. In particular, assessment will be undertaken of the frequency of their spontaneous communication initiations and the forms of those communications.

- Two months after the end of the intervention protocol, the children will be video recorded again while participating in the same range of activities. This will ascertain the development of the children's ability to initiate communications. These data will constitute the second line of information.

- The second set of video recordings will be analysed to ascertain the frequency, method, circumstances, partners, and activities associated with initiating communications.

Referring to steps 2, 3, and 4 (above), after recording the pre-intervention classroom activities the researcher will review the video recordings to identify some current practices which the teachers are using to foster communication. He will then present the videos to the staff to highlight the various techniques they are using and to consider where they are proving to be effective or not. Strategies which are demonstrably successful in promoting communication might be included in the intervention, but those techniques deemed ineffective will be avoided.

10. DOES THE PROJECT INVOLVE PARTICIPATION OF PEOPLE OTHER THAN THE RESEARCHERS AND SUPERVISORS?

Yes☒No ☐

Note: "Participation" includes both active participation (such as when participants take part in an interview) and cases where particip☒ants take part in the study without their knowledge and consent at the time (for example, in crowd behaviour research).

If you have answered NO please go to Section 18 . If you have answered YES to this question please complete all the following sections.

11. PARTICIPANTS AS THE SUBJECTS OF THE RESEARCH

Describe the number of participants and important characteristics (such as age, gender, location, affiliation, level of fitness, intellectual ability etc.). Specify any inclusion/exclusion criteria to be used.

This project will include about six to eight boys aged 5-8 who have severe forms of autism and very limited ability to communicate. It will also include about three or four male teachers and teaching assistants. The teachers and children will be from a school in Jeddah, Saudi Arabia. The school serves the needs of children on the autism spectrum as well as children with other developmental and learning difficulties.

Inclusion criteria (children):

- A diagnosis (using DSM criteria) of autism
- Very limited ability to communicate verbally (expected to have a vocabulary of only 20-30 words and limited ability to recognise pictures or other symbols).
- Very limited ability to communicate with adults and peers.

Exclusion Criteria (children):

- Those with other clinical syndroms and conditions which might affect the study (e.g.Down Syndrome, Cerebral Palsy)

Inclusion criteria (staff):

Those who work regularly with the participating boys.

12. RECRUITMENT

Please state clearly how the participants will be identified, approached and recruited. Include any relationship between the investigator(s) and participant(s) (e.g. instructor-student).

Note: Attach a copy of any poster(s), advertisement(s) or letter(s) to be used for recruitment.

I have worked for several years in the education system in Jeddah, Saudi Arabia. Most of my work being with boys with ASD or with other learning difficulties. I am familiar with the school and the staff. I have had preliminary approval to conduct this research.

13. CONSENT

a) Describe the process that the investigator(s) will be using to obtain valid consent. If consent is not to be obtained explain why**.** If the participants are minors or for other reasons are not competent to consent, describe the proposed alternate source of consent, including any permission / information letter to be provided to the person(s) providing the consent.

A signed consent form (copy attached) will be obtained from the teaching staff who agree to participate in the research. In order to work with and video-record the children a consent form will be sent to the parents. It must be stressed that the researcher will not have personal contact with the participant children; I will be an observer only. Consent forms and information letters will be provided in Arabic. English translation will be submitted for the ethical review process

In the event that a parent refuses permission then his/her child will not be video-recorded, and if a teacher is unwilling to participate then he, too, will not be included in any discussions or in any video-recordings. Instead, other parents and other teachers will be requested to participate.

Note: Attach a copy of the Participant Information Sheet (if applicable), the Consent Form (if applicable), the content of any telephone script (if applicable) and any other material that will be used in the consent process.

b) Will the participants be deceived in any way about the purpose of the study? **Yes** ☐ **No** ☒

If yes, please describe the nature and extent of the deception involved. Include how and when the deception will be revealed, and who will administer this feedback.

14. PARTICIPANT FEEDBACK

Explain what feedback/ information will be provided to the participants after participation in the research. (For example, a more complete description of the purpose of the research, or access to the results of the research).

After completion of this project, I will provide the school with a written report in Arabic of my findings. Any parents who gave approval for their son to participate may have a copy of the report. Also, the participating staff and the school Council may receive a copy. My contact details will be on the consent forms. I will also offer to present my findings to the staff of the school at the completion of my work.

15. PARTICIPANT WITHDRAWAL

a) Describe how the participants will be informed of their right to withdraw from the project.

The right to withdraw by both parents and staff is explained on the consent form. If for any reason either staff or parents find the process difficult then the researcher will remind them of their right to withdraw. Similarly, if any child appears to be distressed by the process, action will be taken to address this.

b) Explain any consequences for the participant of withdrawing from the study and indicate what will be done with the participant's data if they withdraw.

There will be no consequences for the participants. The opportunity for withdrawal will be mentioned in the research report and the data obtained from any participants who withdraw will not be used.

16. COMPENSATION

Will participants receive compensation for participation?

i) Financial **Yes** ☐ **No** ☒

ii) Non-financial **Yes** ☒ **No** ☐

If **Yes** to **either** i) or ii) above, please provide details.

Both staff and parents will be given feedback on the main findings. Also, suggestions may be offered which may enhance future practice in schools.

If participants choose to withdraw, how will you deal with compensation?

The participants will be provided with the results of the study if requested.

17. CONFIDENTIALITY

a) Will all participants be anonymous? **Yes** ☒ **No** ☐

b) Will all data be treated as confidential? **Yes** ☒ **No** ☐

Note: Participants' identity/data will be confidential if an assigned ID code or number is used, but it will not be anonymous. Anonymous data cannot be traced back to an individual participant.

Describe the procedures to be used to ensure anonymity of participants and/or confidentiality of data both during the conduct of the research and in the release of its findings.

Pseudonyms will be given to the children and numbered labels will be allocated to the staff (e.g. TS1-Teaching Staff 1) and used throughout the whole research (collecting and presenting data). A list with the participants' names and their labels will be kept in a secure, locked location. This list will be kept for 10 years after the completion of the project, and then it will be destroyed. The list will be accessible only to the researcher. Nothing will be included in the report which might identify any of the children or staff.

If participant anonymity or confidentiality is not appropriate to this research project, explain, providing details of how all participants will be advised of the fact that data will not be anonymous or confidential.

18. STORAGE, ACCESS AND DISPOSAL OF DATA

Describe what research data will be stored, where, for what period of time, the measures that will be put in place to ensure security of the data, who will have access to the data, and the method and timing of disposal of the data.

In accordance with the University's Code of Practice for Research all data collected will be preserved and accessible for ten years after the completion of the project. All forms of data (notes, videos tapes, correspondence, and lists of participants) will be preserved in a secure location. The researcher will be the only person having access to these. After ten years the documents will be destroyed.

19. OTHER APPROVALS REQUIRED? e.g. Criminal Records Bureau (CRB) checks

☐ YES ☐ NO ☒ NOT APPLICABLE

If yes, please specify.

20. SIGNIFICANCE/BENEFITS

Outline the potential significance and/or benefits of the research

- To identify and confirm good practice for assisting children on the autism spectrum to facilitate spontaneous communication.
- To identify methods whereby teachers can better interact with young children such they may be enabled to communicate more spontaneously with others.
- To identify fundamental issues that children on the autism spectrum have in initiating communication

21. RISKS

a) Outline any potential risks to **INDIVIDUALS**, including research staff, research participants, other individuals not involved in the research and the measures that will be taken to minimise any risks and the procedures to be adopted in the event of mishap

Some teachers may feel concerned, threatened or uncomfortable about being video recorded while working. The researcher will take steps to allay any concerns by stating clearly the purpose of the research, by assuring confidentiality and anonymity, and by allowing staff to withdraw at any time.

The researcher might observe some staff who may appear less competent than others. Such information will not be shared with the school in a way that identifies the individual concerned. Instead, advice on good practice will be emphasised within the report.

Similarly, parents will be fully informed of the purpose of the project. The anonymity of their children and the confidentiality of all information will be assured. They will be reminded that they can withdraw their child at any time

b) Outline any potential risks to **THE ENVIRONMENT and/or SOCIETY** and the measures that will be taken to minimise any risks and the procedures to be adopted in the event of mishap.

None foreseen.

22. ARE THERE ANY OTHER ETHICAL ISSUES RAISED BY THE RESEARCH?

Yes ☐ **No** ☐

If yes, please specify

- Saudi Arabia is a country with strict social codes that include privacy and confidentiality. The researcher is a Saudi citizen and will ensure that all approvals from educational authorities will be obtained prior to commencement.

- The use of video recording is necessary to allow the observer to check all forms of communication between teachers and children both before and after the intervention. This might give rise to some ethical issues. Consequently, parents and teaching staff will be fully informed of all aspects of the investigation before giving their consent. The videos will be used only for research purposes. They will be destroyed at a later date (see above).

23. CHECKLIST

Please mark if the study involves any of the following:

- Vulnerable groups, such as children and young people aged under 18 years, those with learning disability, or cognitive impairments ☒
- Research that induces or results in or causes anxiety, stress, pain or physical discomfort, or poses a risk of harm to participants (which is more than is expected from everyday life) ☐
- Risk to the personal safety of the researcher ☐
- Deception or research that is conducted without full and informed consent of the participants at time study is carried out ☐
- Administration of a chemical agent or vaccines or other substances (including vitamins or food substances) to human participants. ☐
- Production and/or use of genetically modified plants or microbes ☐
- Results that may have an adverse impact on the environment or food safety ☐
- Results that may be used to develop chemical or biological weapons ☐

Please check that the following documents are attached to your application.

	ATTACHED	NOT APPLICABLE
Recruitment advertisement	☐	☐
Participant information sheet	☐	☐
Consent form	☐	☐
Questionnaire	☐	☐
Interview Schedule	☐	☐

24. DECLARATION BY APPLICANTS

I submit this application on the basis that the information it contains is confidential and will be used by the
University of Birmingham for the purposes of ethical review and monitoring of the research project described
herein, and to satisfy reporting requirements to regulatory bodies. The information will not be used for any
other purpose without my prior consent.

I declare that:

- The information in this form together with any accompanying information is complete and correct to the best of my knowledge and belief and I take full responsibility for it.
- I undertake to abide by University Code of Conduct for Research (http://www.ppd.bham.ac.uk/policy/cop/code8.htm) alongside any other relevant professional bodies' codes of conduct and/or ethical guidelines.
- I will report any changes affecting the ethical aspects of the project to the University of Birmingham Research Ethics Officer.
- I will report any adverse or unforeseen events which occur to the relevant Ethics Committee via the University of Birmingham Research Ethics Officer.

Name of Principal investigator/project supervisor:	Dr. Karen Guldberg
Date:	

Please now save your completed form, print a copy for your records, and then email a copy to the Research Ethics Officer, at aer-ethics@contacts.bham.ac.uk. As noted above, please do not submit a paper copy.

APPENDIX 10: INFORMED CONSENT FORM FOR PARENTS

UNIVERSITY OF BIRMINGHAM

STUDY ON COMMUNICATION

Dear Parents

My name is Abdullah Basulayyim and I am a qualified teacher specialising in the education of children with autism. I am currently conducting research for a PhD degree at the School of Education (Autism Centre for Education Research) at the University of Birmingham.

The focus of my research is how to help children develop their communication skills and how to support them to communicate with others. As you know, a distinguishing feature of autism is the difficulty which children have communicating and interacting with others. In particular, their inability to initiate spontaneous communication. My study will examine the ways in which children and teachers interact within the school and then propose alternative methods which the staff adjust their behaviour to encourage children to commence communications. To do this work it will be necessary to observe and record (for later reference) the current forms of interaction between teachers and children, to work with the teachers to use new and different forms of interaction, and then (at a later date) to observe whether the new style of interaction have helped the children. As the researcher, my role will be to observe. I will not have any interaction with any of the children my interaction will be with staff.

This year I am planning to work with the staff [redacted](autism center) to implement an approach, which is encourage children's efforts to initiate communication. The study will not affect the children's daily school routine, and the school's timetable and curriculum will continue as usual.

In order to observe how each child communicates and how their communication could be further developed, I plan to video-record some lessons in your child's class. This recording will be used to assist me with analysing my observations.

At a later stage it will greatly help my investigation if some teachers participate in an interview about how their respective pupils communicate in the classroom.

The observations and findings which I make will be included in the thesis for my PhD degree. As required by the University's Code of Practice for Research', confidentiality and anonymity will be strictly observed. The names of children, parents, and teachers will not be divulged. Pseudonyms will be used in the final report which will not contain anything which might identify the individuals who have participated in this investigation. To ensure confidentiality and anonymity all video-tapes, notes, or other written material which I might make in the course of this work will be stored in a secure, locked location and used solely for this research. I will be the only person with access to the storage. As required by the University's Code of Practice for Research', all the video-tapes and notes will be destroyed after ten years.

I am writing to request your approval for your child to be part of this research and to be video-recorded. Your support will be greatly appreciated. However, if you later wish to withdraw him/her from this project then you may do so at any time. If you withdraw you can still be informed about the findings when the research is completed.
Please indicate below whether you are willing for your child to be a part for this study.
I am/we are willing for my/our child to be in the study ☐
I/we are not willing for my/our child to be part of the study ☐
Name of child: _____
Name of parent/carer_____
Signed: _____ mother/father/carer
Date: _____
You can contact me by email on [redacted] or talk to me in person.
My phone number is [redacted]
Thank you

APPENDIX 11: CONSENT FORM FOR STAFF

UNIVERSITY OF BIRMINGHAM

STUDY ON COMMUNICATION

Dear Mr/Mrs

My name is Abdullah Basulayyim and I am a qualified teacher specialising in the education of children with autism. I am currently conducting research for a PhD degree at the School of Education (Autism Centre for Education Research) at the University of Birmingham. United Kingdom.

The subject of my research is how to help children with autism develop their communication skills and to support them to communicate with others. As you know, a distinguishing feature of autism is the difficulty which children have communicating and interacting with others. In particular, their inability to initiate spontaneous communication. My study will examine the ways in which children and staff interact within the school and then (if appropriate) propose alternative methods which staff might use to encourage children to commence communications. To do this work it will be necessary to observe and record (for later reference) the current forms of interaction between staff and children, to work with the staff to adjust forms of interaction, and then (at a later date) to observe whether the new methods have helped the children. As the researcher, my role will be to observe only. I will not have any communication or interaction with any of the children.

I am writing to you now to request permission to attend your classes in order to observe how each child communicates with you and how interaction between the child and you. If your permission is granted I would like to video-record some lessons in your class so as to examine the ways in which the children communicate with you and with others. Also, it would greatly assist me in my enquiry to obtain your views about how each child communicates. In making this request I stress that you will not have to change your usual lesson format in any way. You will be provided with information about the facilitative interactive style and then, with your collaboration, objectives will be set for helping each child initiate interactions.

As required by the University's 'Code of Practice for Research', confidentiality and anonymity will be strictly observed. The names of children, parents, and teachers will not be divulged to anyone. Pseudonyms will be used in the final report, and there will not be anything which might identify the individuals who participated in this investigation. To ensure confidentiality and anonymity all video-tapes, notes, or other written material which I might make in the course of this work will be stored in a secure, locked location and used solely for this research. I will be the only person with access to the storage. As required by the University's 'Code of Practice for Research', all the video-tapes and notes will be destroyed after ten years.

If, after initially agreeing, you later wish to withdraw from the study you may do so at any point. If you withdraw you can still be informed about the findings when the research is completed. I will be writing my observations and findings in the thesis for my PhD degree.

Please tick the box below to indicate whether you/are not willing to be involved in the study.

I am willing to participate in the study ☐
I will not participate in the study ☐
Name: _____
Qualification: ……..
Signed: _____
Date: _____
Should you require any further information about the study please contact me by email on [redacted] Or you may call me; my phone number is XX

APPENDIX 12: AISI PRINCIPLES WITH SOME IMAGES

General principles	Definition
1. Gain children's attention	Prior to addressing the child, the adult calls him by name. Alternatively, he may say something similar to *'Salam Alikum*, *'Ali's turn'*. To gain attention, he may also sing songs, for instance *'Sabah Alkhair" Good Morning" how are you?'* and either touch the child, hold his/her hand, or perhaps tenderly blow on his/her cheek. After the child starts paying attention, the adult should pause for a short moment.
2. Establish appropriate proximity and contact	The adult lowers his position to either equal, or lower level and sets a distance from him/her (approximately 60 cm). The adult makes slow and predictable movement, trying not to approach the child from behind. In Breakfast: only code it should the adult approach the table from far
3. Show you are available to the children	The adult reaches out, his hands almost touching the child (the palms face either up or down). The body and shoulders fixed in a relaxed position, gentle eyes, look expressing expectation or question. the Adult try to avoid String
4. Wait for initiations	Although the wait may become uncomfortable, the adult should avoid interfering until the point where it is obvious that child's initiation is unlikely (the minimum waiting tome for initiation is 5 seconds).
5. Respond to the children's attempts to communicate	The adult allows the child to both initiate and terminate activities – he gives him/her the object he/she requests and takes away one he/she rejects. The adult acknowledges the child's attempt to communicate even when it is impossible to immediately begin or end the activity.
6. Assign meaning to the children's apparently random actions or sounds	The adult reacts to the child's behaviour as if it were communicative (for instance, if he/she rocks, the adult sits and, facing the child, starts singing and acting out). Child's unconventional or pre-intentional attempts to communicate are assigned meanings (e.g. if, in an attempt to reach an object, the child jumps, the adult reacts as if being asked by to bring the object down; if the child shows interest in a photo, the adult gives him/her the object or food the photo shows). This principle is coded when not all the 5 elements for an act to be communicative (Bogdashina, 2005)
7. Imitate the children	The adult imitates and then pauses to allow the child to respond further. In turn-taking activities, the time of adult's and child's turns should be equally long to keep the child interested. If the child does not pay attention to the imitation, the adult can try vocalising by means of a cardboard, plastic tube, or by a plastic 'echo mike'. It is also possible to use drums or other simple sound-making devices to imitate the sounds or actions the child makes.
8. Follow children's focus of attention	Whatever the child is interested in or does, the adult follows, watches, talks, or preferably sings about it. Ibn case the child leaves the adult to engage in an activity, the adult follows him/her and participates in the activity.

9. Use exaggerated pitch, facial expression, gestures and body language	The adult uses animated pitch (e.g. exclamation words such as *'ya'*, *'wow, uh'*, words which increase anticipation, enthusiastic singing, loud laughs), gestures (e.g. wiggle fingers before tickling) and body language (stamping feet, clapping hands or tapping the floor). Female staff are generally better at using this principle than men.
10. Use minimal speech	The adult chooses maximum 4 words he will use and associates them with specific aspects of the current situation (e.g. *'time for work'*, *'first work, then plays'*). Some words, e.g. *'good boy'*, *' look'*, *'well done'*, *'good job'*, are rather abstract and require gestures (e.g. thumbs up, pointing), or symbols (e.g. 'star' for 'well done') to be coded as minimal speech.
11. Provide time	The adult allows the child time to handle the information. Autistic children's processing skills have average delay of 10 seconds (Woodcock and Page, 2010). The adult repeats both the question and the directions if the child provides no response. As opposed to principle no. 4, this one requires the adult to provide the child with a piece of information.
12. Expand on communicative attempts	Based on the child's initiation, the adult creates the following stage of his communication development. In case of a non-verbal initiation, the adult uses single words and models two and three word phrases. If the child uses a word or an approximation to ask for an object (e.g. 'tars' with or without symbol), the adult may say, when the child hold photo the adult model one or two words. For instance, when Albeshri says the word "Juice", the adult replies with the whole sentence "I want juice "
13. Use non-verbal cues	To help the child understand what is asked of him, the adult may use non-verbal cues, i.e. symbols/pictures (e.g. showing their timetable, 'finish' or 'wait' symbol), objects of reference (e.g. show their coat when it's time to play outside), gestures (e.g. 'come here', pointing), physical prompts (e.g. the touch of the child's hands by the adult should server as a reminder for the kids that they are expected to do something whilst the adult employs their body as a way of preventing the child from going away to prevent the child from leaving) and Makaton signs. In case the adult uses more than one cue, he should code 1 tally. If the use of the cue exceeds 5 seconds, he should code another tally in accordance with the 5-second rule.
Communcative Opportunity	
1.Give a choice of activity, equipment or food	Without any verbal cue, the adult allows the child to select activity, food, or drink. The child can either choose from two different objects in the adult's hands, or provide the child with a photo choice board for toys for example from the study (the staff offer the child two different juice and let the child chose.
2. Stop part-way through an activity or social interaction	The adult stops an activity or social interaction with the child to give him/her an opportunity to ask to continue. The stop is sudden and can be accompanied by exclaiming '*stop*' or '*uh, uh'* (for instance, the adult abruptly stops the 'burst and pause' game).

3. Give small portions (so children can ask for more)	The child is only given small portions of food or dinks so that he/she can request more (for instance, if the child asks the adult for a biscuit or fruit, he hives him/her only a few pieces).
4. Make items inaccessible (so children have to ask for them)	The adult selects certain items and puts them 'in sight but out of reach'. The child is thus forced to request them directly (for instance, instead of putting equipment to a central spot in the room, the adult waits for the child to ask for the object of his/her choice).
5. Give children materials that they will need help with	The child is given an item he/she needs assistance with so that he is forced to ask for help (for example a box of chocolates which is difficult to open). In case the child is unresponsive for more than 10 second, the adult guides him/her.
6. Contradict children's expectations	The adult suddenly breaks the routine with an action that forces the child to interact (for instance, the adult turns an object upside down to see if the child restores its original position, or he reads a book upside down, turning pages backwards).
7. Give children known non-preferred items	The child is given an object he/she is not interested in so that he/she is forced to protest (for instance, the adult gives him/her a toy or drink he/she dislikes). Note: The adult only gives the child such items if the child did not request anything else. In case a child asks for an object, he should be either given it, or the adult should use some indication showing the child how to get it whilst never giving the children an item they did not want instead. The latter case may confuse the child, as he receives a disliked object in spite of asking for a different one.
8. Set up a situation where you 'forget' something vital	The adult creates a situation in which something vital is 'forgotten' (for instance, he assists the child with putting only one shoe and pretending to forget about the other. This principle is often rejected by the staff, as they are afraid of upsetting the child.
9. Withdraw the child attention	Gradually, the adult stops making the child request more.

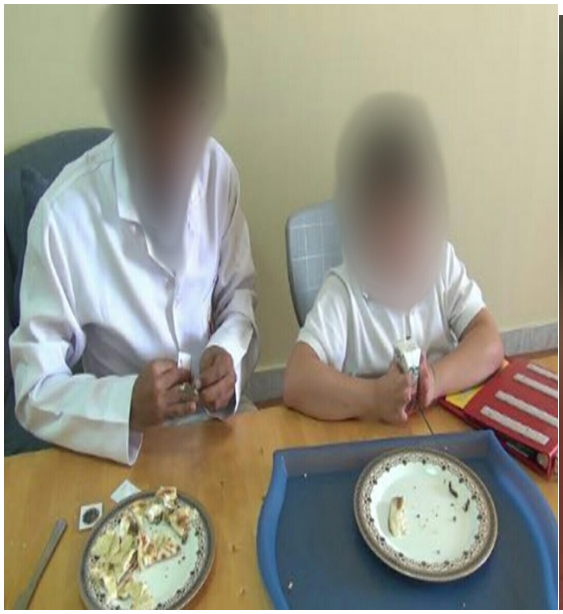
Gain the child's attention
Using exaggerated

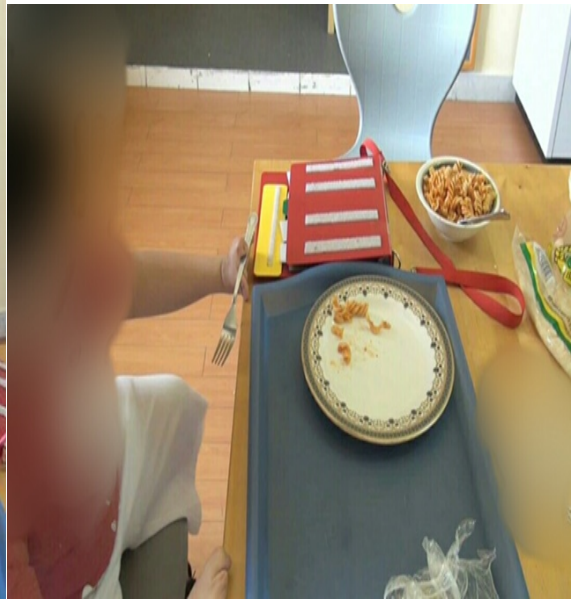
Expand on communication attempt
Using non-verbal cues

Waiting for initiation
Give the child material that need help with
Show availability

Stop part way
Respond to the child
Imitate the child

Give small Portion
Waiting for the child Initiation
Expand on communication
Establish Proximity /touch
Forget something Vital



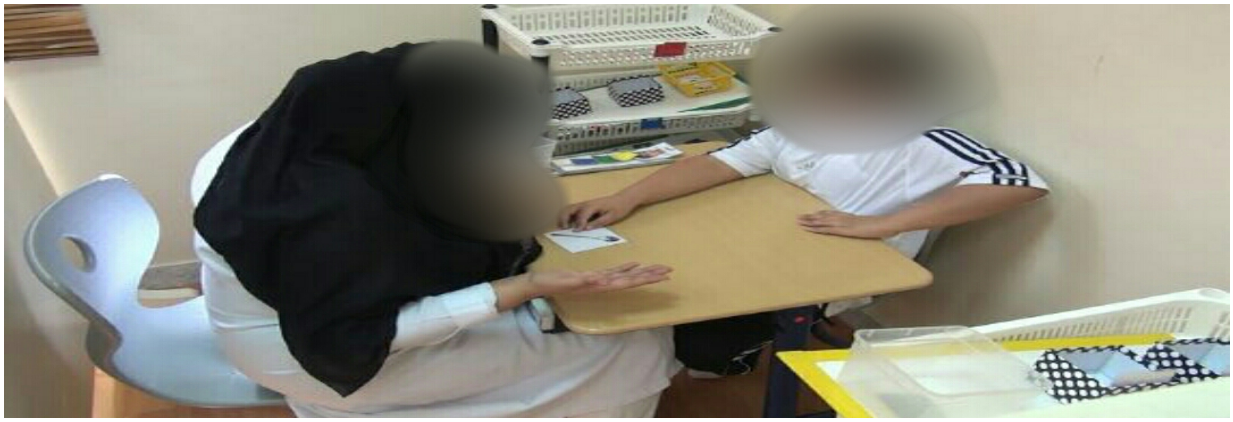


Using Non verbal Cues
Gain the child attention

Exaggerated pitch
Waiting for initiation
Provide time to process information
Imitate the child

Offer choices

Show Availability
Waiting for the child initiation



Give non preferred items

APPENDIX 13: PRE-POST INTERVENTION OUTCOMES: MEAN, STANDARD DEVIATION, CHANGE SCORE AND COHEN'S dEFFECT SIZES (N = 5)

CATEGORY	Pre-Intervention		Post-Intervention				
	Mean	*SD*	*Mean*	*SD*	*Change Score*	*Cohen's d*	*ES Interpretation*
Total Initiations Across 3 Activities	64.4	25.98	112.4	21.02	48.0	2.04	Large
Activity: Breakfast	22.6	9.84	45.4	11.67	22.80	2.12	Large
Activity: One-to-One	21.4	8.35	32.6	10.99	11.20	1.16	Large
Activity: Unstructured	20.4	8.82	28.6	5.90	8.20	1.11	Large
Communication Functions: Behaviour Regulation (BR)	30.4	9.58	52	10.12	21.60	2.19	Large
BR – Breakfast	14.2	4.82	30	5.87	15.80	2.96	Large
BR – One-to-One	8.4	1.67	10	3.16	1.60	0.66	Large
BR – Unstructured	7.8	3.96	12	5.15	4.20	0.92	Large
Requests Across 3 Activities	16.6	3.58	42.4	7.16	25.80	4.80	Large
Reject/Protest Across 3 Activities	13	10.32	12.2	6.42	-0.80	-0.10	Small
Communication Functions: Joint Attention (JA)	4.6	2.30	9.4	6.11	4.80	1.14	Large
JA – Breakfast	1	1.00	2.4	1.82	1.40	0.99	Large
JA – One-to-One	1.6	0.89	3.8	2.17	2.20	1.44	Large
JA – Unstructured	2	1.22	3.2	2.86	1.20	0.59	Medium
Comment/Give Info Across 3 Activities	4.6	2.30	8.8	5.40	4.20	1.09	Large
Seek Information Across 3 Activities	0	0.00	0.6	0.89	0.60	1.34	Large
Communication Functions: Social Interaction (SI)	29.2	14.60	49.4	21.45	20.20	1.12	Large
SI – Breakfast	7.2	4.60	13	6.52	5.80	1.04	Large
SI – One-to-One	11.4	6.66	18.4	8.68	7.00	0.91	Large
SI – Unstructured	10.6	4.39	18	8.46	7.40	1.15	Large
Express Feelings Across 3 Activities	23.6	14.93	29.8	21.39	6.20	0.34	Small
Seek Attention Across 3 Activities	3.6	3.51	11.8	3.03	8.20	2.51	Large
Seek Approval Across 3 Activities	1	1.00	3.4	4.98	2.40	0.80	Large
Social Routines Across 3 Activities	0.2	0.45	1.2	0.84	1.00	1.56	Large
Social Games Across 3 Activities	1	1.41	3.4	3.44	2.40	0.99	Large

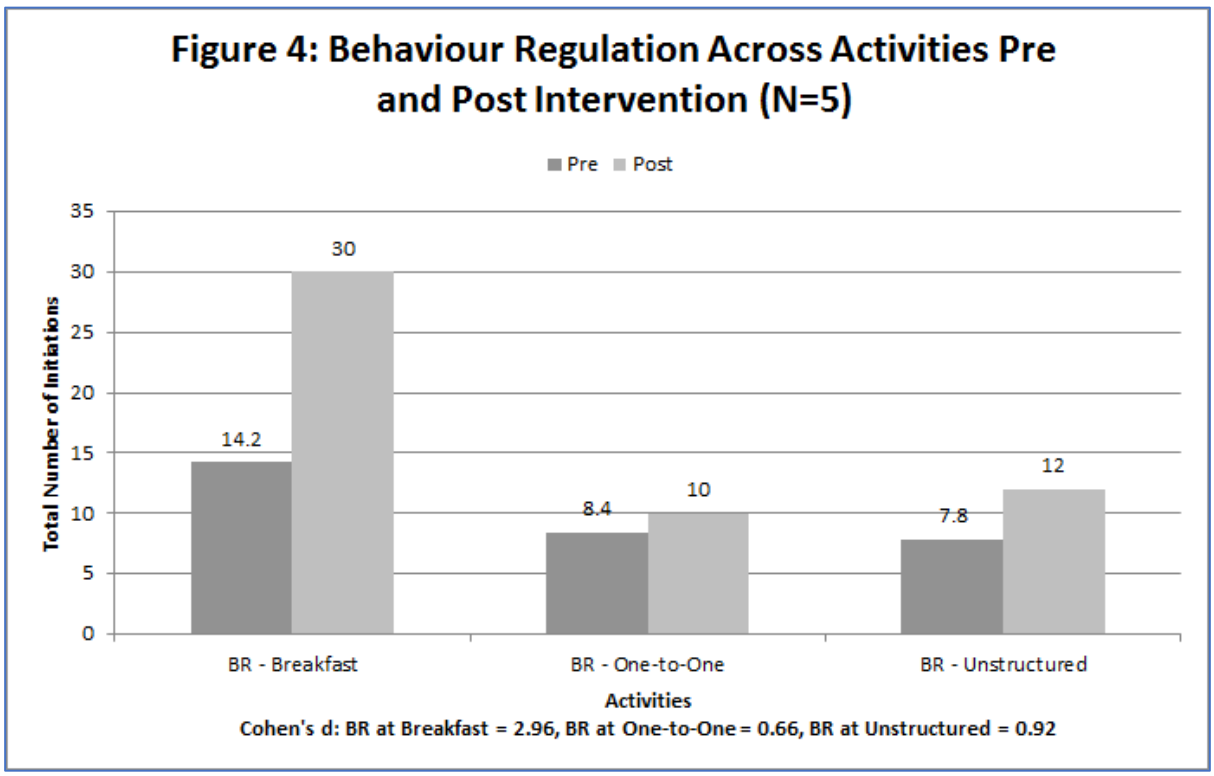
APPENDIX 14: PRE-POST INTERVENTION OUTCOMES 2: MEAN, STANDARD DEVIATION, CHANGE SCORE AND COHEN'S d EFFECT SIZES (n = 5)

CATEGORY	Pre-Intervention		Post-Intervention				
	Mean	*SD*	*Mean*	*SD*	*Change Score*	*Cohen's d Effect Size*	*Effect Size Interpretation*
PRE-SYMBOLIC MEANS							
Challenging Behaviour	7.2	12.56	6.6	6.31	-0.60	-0.06	Small
Eye Contact	4.4	2.30	10.8	2.28	6.40	2.79	Large
Eye Pointing	0.00	0.00	2.4	2.51	2.40	1.91	Large
Laugh	3.4	2.19	2	2.83	-1.40	0.56	Medium
Point	4.2	2.05	13.4	1.95	9.20	4.60	Large
Proximity/Touch	5.4	3.36	7.6	4.51	2.20	0.56	Medium
Re-enactments	0	0.00	0	0.00	0.00	0.00	n/a
Simple Motor Actions	11.2	9.34	15.8	8.98	4.60	0.50	Medium
Smile	1.8	2.68	3	3.39	1.20	0.40	Small
Vocalizations/Babbling	16.2	7.85	24.8	8.14	8.60	1.08	Large
Other:	0	0.00	0	0.00	0.00	n/a	n/a
SYMBOLIC MEANS							
Delayed Echolalia	0	0.00	0	0.00	0.00	n/a	n/a
Immediate Echolalia	0	0.00	0	0.00	0.00	n/a	n/a
Object of reference	0	0.00	0.8	1.10	0.80	1.46	large
Single Words[1]	4.4	9.84	7.2	16.10	2.80	n/a	n/a
Signs/Gestures	0.6	0.55	3.4	3.78	2.80	1.29	large
Symbols/Pictures	8.6	2.51	18.6	5.13	10.00	2.62	large
Word Combinations	0	0.00	0	0.00	0.00	n/a	n/a
Other:	0	0	0	0.00	0.00	n/a	n/a

[1] No calculation for Single Words as only 1 child (Albeshri) spoke single words pre and post intervention. Other four children were non-verbal.

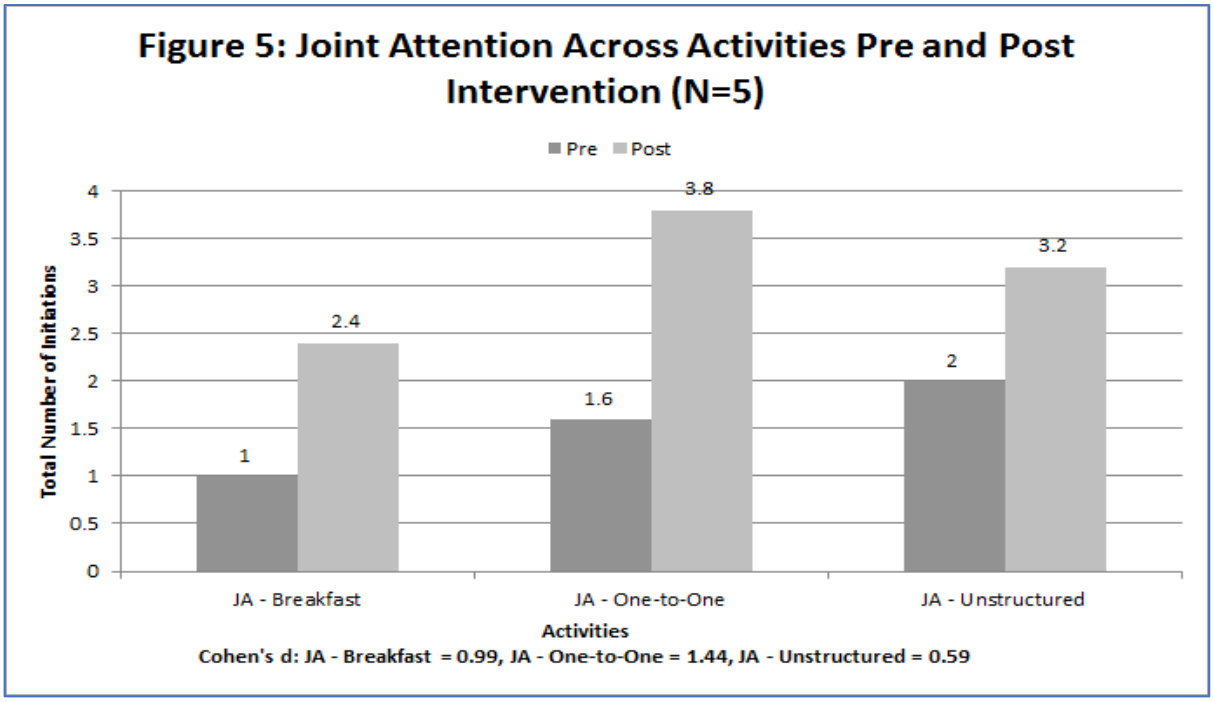
APPENDIX 15: COMMUNICATIVE FUNCTIONS IN DETAIL

Behaviour regulation across each activity



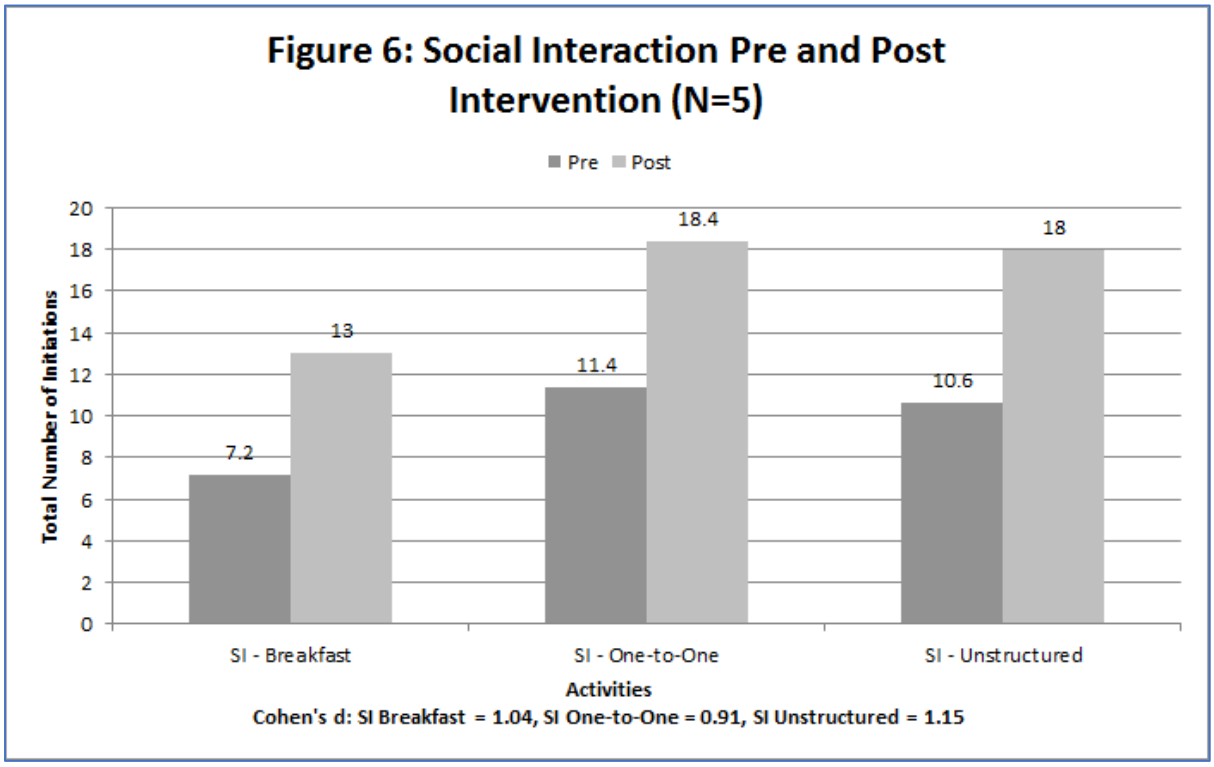
APPENDIX 16: COMMUNICATIVE FUNCTIONS IN DETAIL: JOINT ATTENTION ACROSS EACH ACTIVITY

Communicative functions in detail: Joint attention across each activity

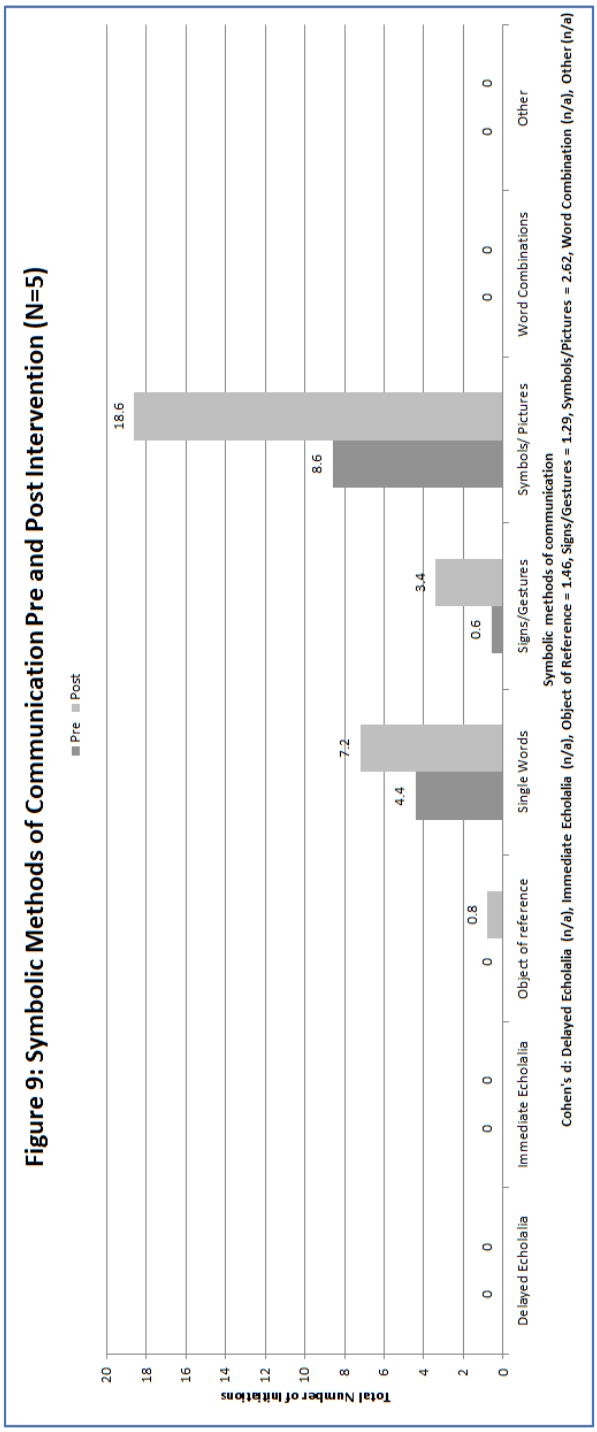


APPENDIX 17: COMMUNICATIVE FUNTION IN DETAIL: SOCIAL INTERACTION ACROSS ACTIVITIES

Figure 6: Communicative functions: social interaction across activities



APPENDIX 18: COMMUNICATIVE FUNCTION IN DETAIL: METHODS OF COMMUNICATION ACROSS ACTIVITIES



APPENDIX 19: STAFF DATA USING AISI PRINCIPLES

Breakfast activity – Mean staff use of AISI principles and communicative opportunities, pre- and post-intervention (N=5)

AISI Principles	Pre	Pre	Post	Post	Change	Cohen's *d*	Effe Size Inte etat
	Mean	SD	Mean	SD	Score[1]	Effect Size	
. Establish appropriate proximity/contact	1.20	0.45	2.00	0.71	0.80	1.39	Lar
. Show availability	1.80	0.55	3.80	1.30	2.00	2.16	Lar
. Gain child's attention	2.60	2.19	4.00	1.22	1.40	0.82	Lar
. Wait for initiations	3.80	1.00	7.60	0.89	3.80	4.01	Lar
. Responds to all communicative attempts	2.40	2.97	4.80	0.45	2.40	1.41	Lar
. Assign meaning to random actions or	00	1.82	0.00	0.00	0.00	0.00	N/A
. Imitate the child	0.00	0.00	0.00	0.00	0.00	n/a	N/A
. Follow child's lead/focus of attention	0.20	0.00	0.80	0.84	0.60	1.43	Lar
. Use exaggerated pitch, facial expression,	0.60	0.45	1.60	1.82	1.00	0.88	Lar
0. Use minimal speech	4.00	1.10	5.80	0.45	1.80	2.33	Lar
1. Provide time to process information	1.80	1.82	3.80	0.84	2.00	1.51	Lar
2. Expand on communicative attempts	5.20	1.67	8.80	1.10	3.60	2.60	Lar
3. Use non-verbal cues	2.20	3.29	4.40	2.88	2.20	0.71	Lar
Communicative Opportunities							
. Offer choice	0.80	1.30	1.80	1.10	1.00	0.83	Lar
. Stop part-way	0.20	1.30	0.00	0.00	-0.20	0.31	Sma
. Give small portions	1.60	0.89	5.80	0.45	4.20	6.26	Lar
. Make items inaccessible	1.60	2.68	3.60	0.89	2.00	1.12	Lar
. Give material the child will need help	1.00	1.14	2.20	1.10	1.20	1.07	Lar
. Contradict expectations	0.00	1.00	0.00	0.00	0.00	0.00	Noc
. Give non-preferred items	0.00	0.00	1.80	1.48	1.80	2.43	Lar
. Withdraw attention	0.00	0.00	0.20	0.45	0.20	0.89	Lar
. Forget something vital	0.40	0.89	0.60	0.55	0.20	0.28	Sma

[1] *Change score is post-mean–pre-mean.* [2] Cohen's *d* effect size interpretation: 0.2 small, 0.5 medium, 0.8 large-effect size.

One-to-one activity – Mean staff use of AISI principles and communicative opportunities, pre- and post-intervention (N=5)

AISI Principles	Pre Mean	Pre SD	Post Mean	Post SD	Change Score	Cohen's *d* Effect Size	Effect Size Interpretation[2]
1. Establish appropriate proximity/contact	1.40	1.14	2.00	0.71	0.60	0.65	Mediu
2.Show availability	2.00	1.22	2.40	1.34	0.40	0.31	Small
3.Gain child's attention	3.00	1.73	6.40	0.89	3.40	2.59	Large
4.Wait for initiations	2.80	1.48	5.00	0.71	2.20	2.01	Large
5.Responds to all communicative attempts	1.60	1.14	4.00	1.73	2.40	1.67	Large
6.Assign meaning to random actions or	1.00	1.00	1.00	1.41	0.00	0.00	Nocha
7.Imitate the child	0.20	0.45	1.20	1.64	1.00	0.96	Large
8.Follow child's lead/focus of attention	0.40	0.89	0.80	1.10	0.40	0.40	Small
9.Use exaggerated pitch, facial expression,	1.60	1.52	4.20	2.39	2.60	1.33	Large
10.Use minimal speech	3.20	1.79	5.40	0.89	2.20	1.64	Large
11.Provide time to process information	2.80	1.30	4.40	1.14	1.60	1.31	Large
12.Expand on communicative attempts	2.60	2.41	6.40	1.14	3.80	2.14	Large
13.Use non-verbal cues	2.60	1.14	4.40	2.88	1.80	0.90	Large
Communicative Opportunities							
1.Offer choice	0.00	0.00	0.40	0.89	0.40	0.89	Large
2.Stop part-way	0.20	0.45	0.60	0.89	0.40	0.60	Mediu
3.Give small portions	0.00	0.00	0.80	1.30	0.80	1.23	Large
4.Make items inaccessible	0.40	0.89	2.00	1.41	1.60	1.39	Large
5.Give material the child will need help with	0.00	0.00	0.40	0.89	0.40	0.89	Large
6.Contradict expectations	0.00	0.00	0.00	0.00	0.00	N/A	N/A
7.Give non-preferred items	0.00	0.00	0.40	0.55	0.40	1.46	Large
8.Withdraw attention	0.00	0.00	0.00	0.00	0.00	N/A	N/A
9.Forget something vital	0.00	0.00	0.00	0.00	0.00	N/A	N/A

[1] *Change score is post-mean–pre-mean.* [2] Cohen's *d* effect size interpretation: 0.2 small, 0.5 medium, 0.8 large-effect size.

Unstructured activity – Mean staff use of AISI principles and communicative opportunities, pre-and post-intervention (N=5)

AISI Principles	Pre Mean	Pre SD	Post Mean	Post SD	Change Score[1]	Cohen's *d* Effect Size	Effect Size Interpretation[2]
1. Establish appropriate proximity/contact	1.40	1.34	2.40	0.89	1.00	0.89	Large
2.Show availability	1.40	1.52	3.20	0.45	1.80	1.83	Large
3.Gain child's attention	3.60	0.89	4.80	0.45	1.20	1.79	Large
4.Wait for initiations	2.80	1.30	4.60	1.82	1.80	1.15	Large
5.Responds to all communicative attempts	2.20	0.45	3.60	0.89	1.40	2.09	Large
6.Assign meaning to random actions or	0.40	0.89	1.40	1.34	1.00	0.89	Large
7.Imitate the child	0.80	1.79	2.60	1.67	1.80	1.04	Large
8.Follow child's lead/focus of attention	0.60	0.89	1.00	1.00	0.40	0.42	Small
9.Use exaggerated pitch, facial expression,	1.40	1.14	4.20	2.68	2.80	1.46	Large
10.Use minimal speech	2.60	1.52	4.80	0.45	2.20	2.24	Large
11.Provide time to process information	1.60	1.52	4.20	0.84	2.60	2.21	Large
12.Expand on communicative attempts	3.80	0.84	6.00	1.22	2.20	2.13	Large
13.Use non-verbal cues	2.40	1.67	5.00	1.58	2.60	1.60	Large
Communicative Opportunities							
1.Offer choice	0.80	1.10	1.00	1.41	0.20	0.16	Small
2.Stop part-way	0.60	0.89	2.20	1.30	1.60	1.46	Large
3.Give small portions	0.60	0.89	1.80	1.79	1.20	0.89	Large
4.Make items inaccessible	2.00	1.22	1.80	1.79	0.20	0.13	Small
5.Give material the child will need help with	0.00	0.00	1.00	1.00	1.00	2.00	Large
6.Contradict expectations	0.00	0.00	0.00	0.00	0.00	n/a	N/A
7.Give non-preferred items	0.00	0.00	0.40	0.55	0.40	1.46	Large
8.Withdraw attention	1.40	1.34	0.60	1.34	0.80	0.60	Medium
9.Forget something vital	0.00	0.00	0.00	0.00	0.00	n/a	N/A

[1] *Change score is post-mean–pre-mean.* [2] Cohen's *d* effect size interpretation: 0.2 small, 0.5 medium, 0.8 large-effect size

APPENDIX 20: DATA REGARDING INDIVIDUAL CHILDREN

Children were filmed during three activities (breakfast, unstructured free play and 1:1 work with staff). Two hours of video recordings (i.e. forty minutes per activity) were coded for each child pre- and post-intervention using CICCA. The following section presents brief case studies of individual children, ordered from the strongest responder to the intervention to the weakest responder.

Case study—Albeshri

This section reports the pre- and post-intervention findings for Albeshri, a child aged seven years at pre-intervention (see *table 1*). *Table 2* and *Figure 1 below* summarise the frequency of pre- and post-intervention initiations made by Albeshri.

Table 1: Baseline details for case study (n=1 Albeshri) (Pre-intervention)

Child (Name changed)	**Albeshri**
Sex	Male
Age at pre-intervention assessment (in years)	5 years
Diagnosis	Autism
CARS score	38
Level of verbal communication	Limited vocabulary – uses a few single words Understand between 20-30 words based on his file and his teacher pre assessment

Level of initiation of communication	Based on school observations conducted for this study, and reports by staff, Albeshri quite often initiates communication with adults. He has hyperactivity so he loses attention. And some time be anxious

Table 2 below, lists the type and frequency of communication initiations by Albeshri while performing three activities. It can be seen that for most forms of behaviour there were significant positive changes in initiations of communication. There were increases overall for most categories and most forms of behaviour. In particular, Albeshri made more requests and more actions to gain attention.

Table 2: Frequency of initiations, pre- and post-intervention (Albeshri, n=1)

CATEGORY	**Pre *(n)***	**Post *(n)***	**Change Score**
INITIATIONS BY ACTIVITY			
Breakfast	20	48	28
One-to-One	19	22	3
Unstructured	13	26	13
INITIATIONS BY COMMUNICATIVE FUNCTION			
Total Behaviour Regulation (BR)	28	63	35

Table 3: Frequency of initiations for communication methods: pre-symbolic and symbolic, pre- and post-intervention (Albeshri, n=1)

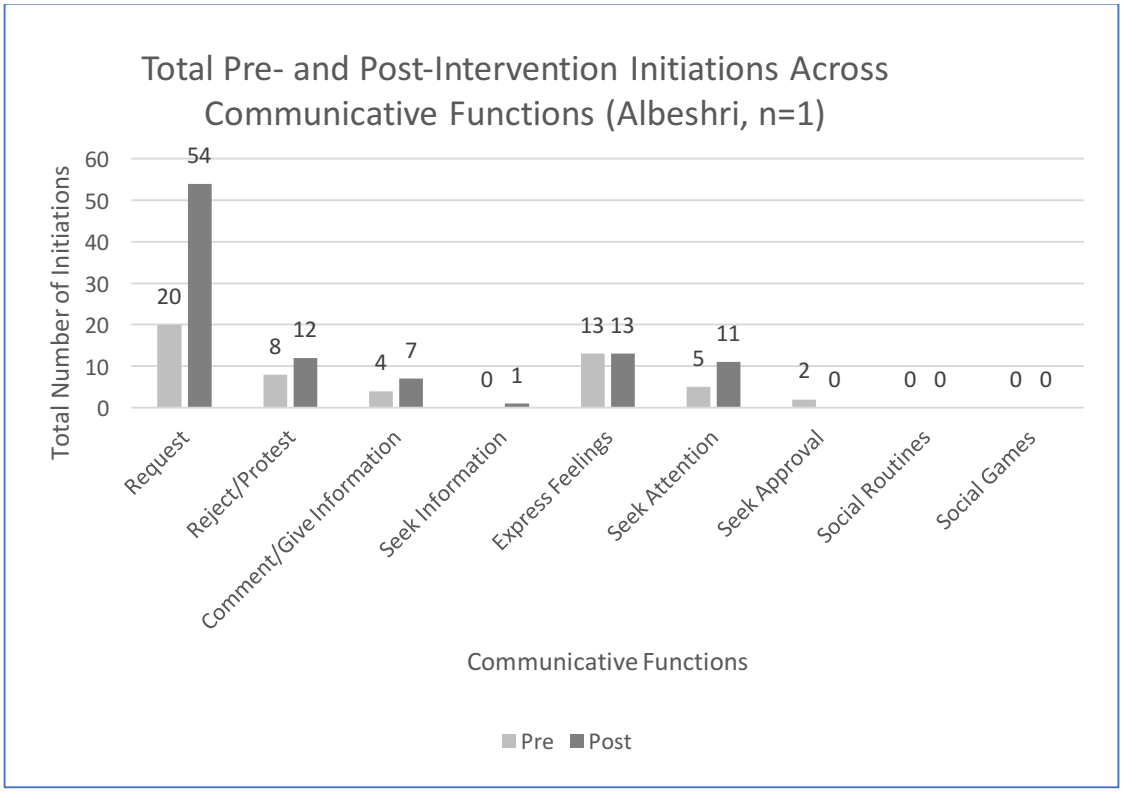
PRE-SYMBOLIC MEANS	**Pre**	**Post**	**Change Score**
Challenging Behaviour	0	12	-12
Eye Contact	2	11	9
Eye Pointing	0	0	0
Laugh	0	0	0
Point	4	14	10
Proximity/Touch	5	3	-2
Re-enactments	0	0	0
Simple Motor Actions	3	10	7
Smile	0	1	1
Vocalisations/Babbling	16	17	1
Other:	0	0	0
SYMBOLIC MEANS			
Delayed Echolalia	0	0	0
Immediate Echolalia	0	0	0
Object of Reference	0	2	2
Single Words	22	36	14
Signs/Gestures	0	6	6
Symbols/Pictures	0	0	0
Word Combinations	0	0	0
Other:			

The positive impact the intervention had on all the activities is evident (see *table 3)* although the variety of communication methods Albeshri utilised was limited. During breakfast, it was obvious that Albeshri enjoyed the activity and it stimulated him to initiate communication more frequently. Nevertheless, he appeared very distressed and nervous during the 1:1 activities post-intervention.

It can be observed that in breakfast and unstructured free play activities, the number of initiations was higher, whilst it decreased during the unstructured ones. However, these

results can be considered as unimportant, as the overall effect of the intervention was undoubtedly positive. His nervousness was related to the fact that his parents decreased the dose of medication he was taking. There was also a slight and, generally speaking, unimportant, decrease during the 1:1 activities (from 10 initiations pre- to 8 post-intervention), owing to his hyperactivity and nervousness.

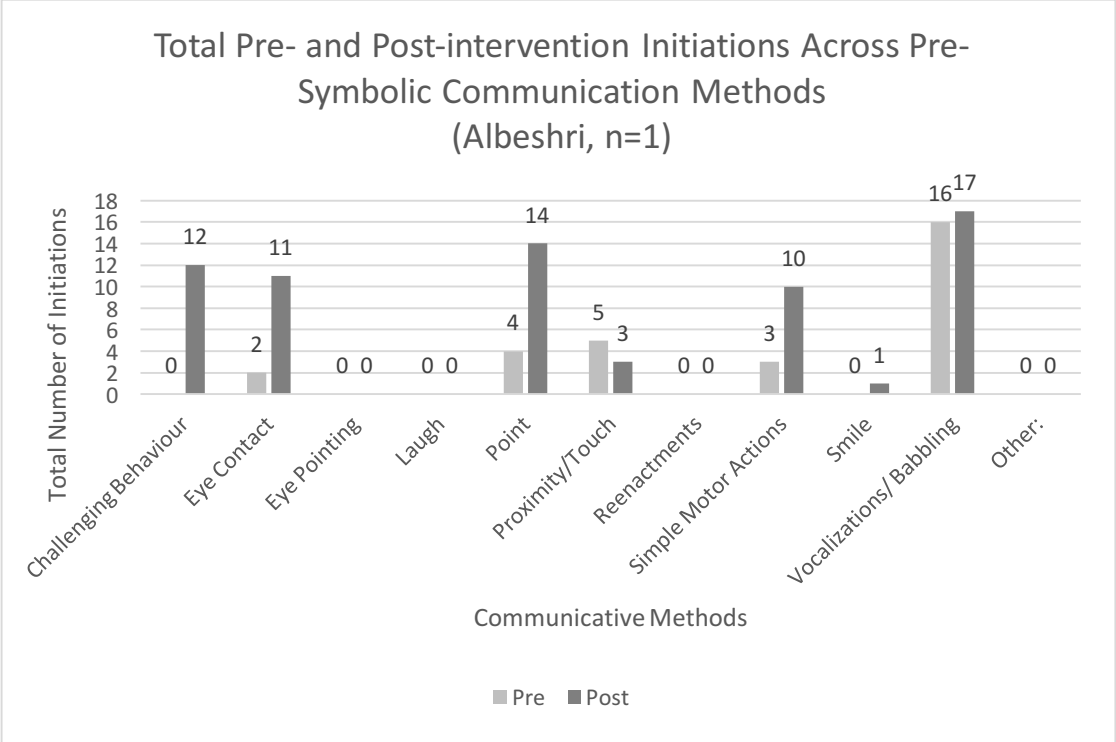
Figure 1: Total pre- and post-intervention initiations across communicative functions (Albeshri, n=1)



It can be seen in *Figure 1*, above, that there were marked increases in the use of four functions (request, reject/protest, comment and seek attention), but the other five functions were barely used by Albeshri. He made significant positive change in the request function. It appears that one of the main reasons for this change was that his teacher gave him more opportunities to make requests, rather than intervening too soon.

Figure 2 below, records the changes in the type and frequency of pre-symbolic and symbolic methods of communication recorded during observation periods of two hours duration. For many forms of communication there was no change. The most notable changes occurred in eye contact, pointing, and simple motor actions and gestures. He continued to use single words, but with greater frequency.

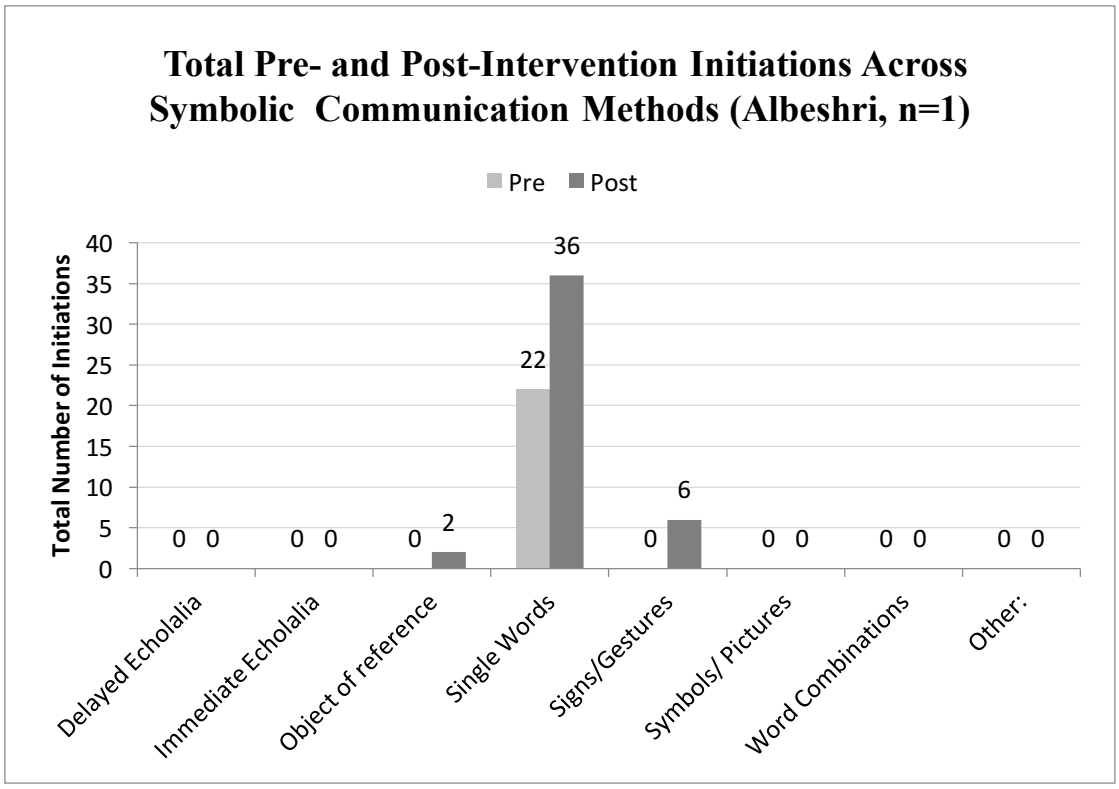
Figure 2: Total pre- and post-intervention initiations across pre-symbolic communication methods (Albeshri, n=1)



Six of the categories showed little/no change in methods of communicating. Four functions recorded higher frequencies of use, and in particular, eye contact, pointing, and simple motor actions. These were Albeshri's main methods of communication prior to the intervention, and they suggest strong positive responses to the different style of interaction by the staff .In this data CB also increased. Based on the video data, his CB is manageable

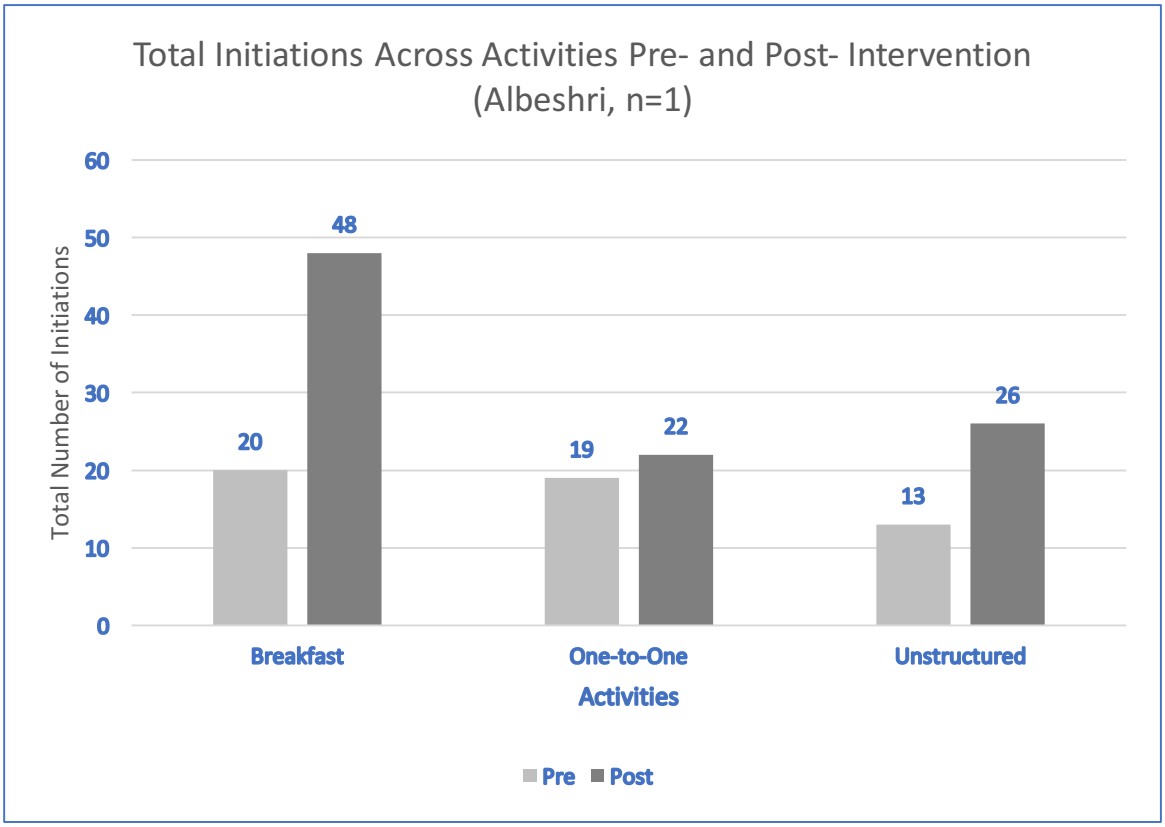
in class, although it can be a difficulty for the child and his family. His staff claimed that Albeshri's parents stopped his medication after seeing he had improved, which probably influenced the research findings. One would expect some decrease in CB if AISI is successfully implemented, but this may not occur immediately. For example, when his staff used a communicative opportunity such as "forget something vital" or "give him non-preferred items," this can initially make the child upset and may (temporarily) increase the use of CB as a form of communication. Albeshri increased his use of most of the communicative methods post-intervention, according to his staff as well as the video data.

Figure 3: Total pre- and post-intervention initiations across symbolic communication methods (Albeshri, n=1)



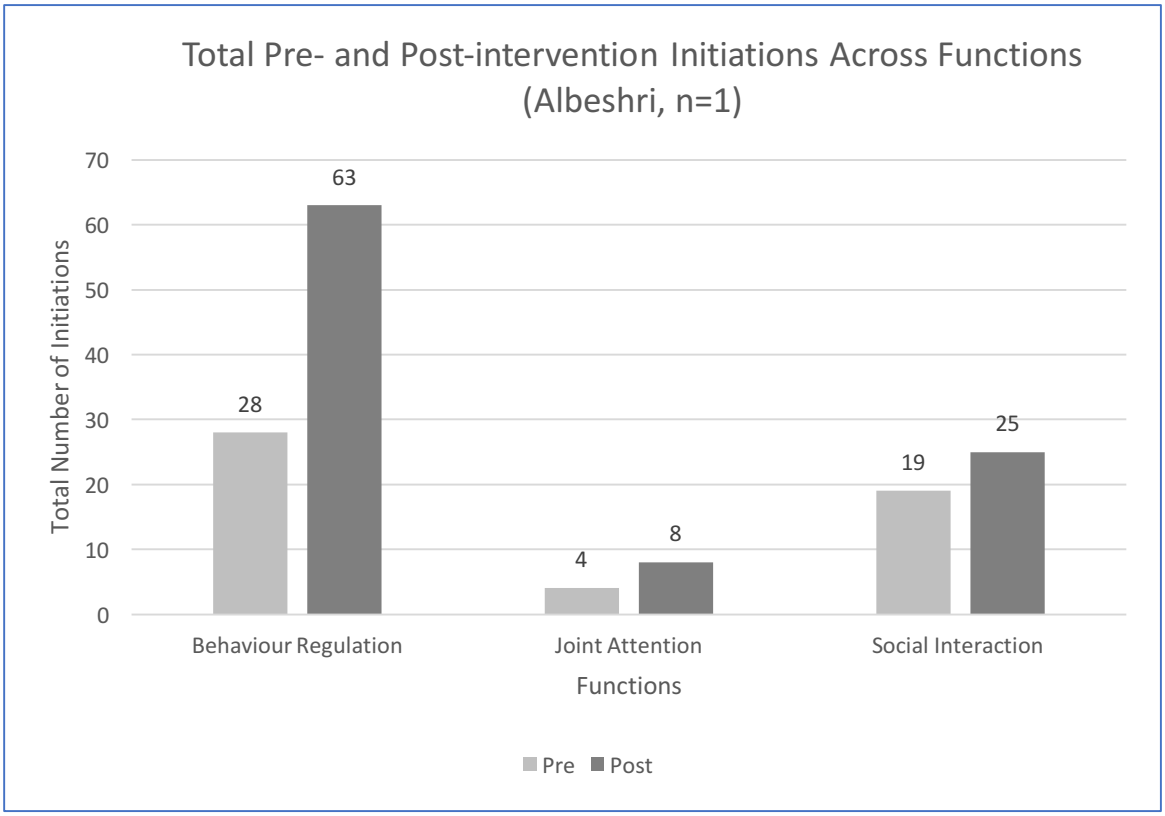
The distinctive feature of *Figure 3 above,* is that five of the communicative methods remained unused even after the intervention. Three symbolic methods (single words, object of reference and gestures) were used with greater frequency, particularly during breakfast and during the unstructured time. It appears that the intervention enabled Albeshri to use these methods with greater confidence. In the video recordings, his staff can be seen to try to support Albeshri to expand his use of single words to word combinations. He was not far from it, and just needed additional time to manage to use word combinations effectively.

Figure 4: Total initiations across activities pre- and post- intervention (Albeshri, n=1)



The positive effects of the AISI intervention were evident in all three activities, though it is pertinent to note that breakfast provided circumstances which led to greater use of words, gestures, and pointing. This was a time when Albeshri was active and animated: he requested the food or drink items that he wanted. Most of his communication initiation occurred in breakfast. During the unstructured acivity Albesri liked to play with the toys or look at a magazine with picture in it.

Figure 5: Total pre- and post-initiations across functions (Albeshri, n=1)



It is evident that, overall, there were more initiations following the intervention, though the range and types of communications remained quite limited. Most initiations were associated with behaviour regulation, which increased from 28 pre- to 63 post-intervention.

The three figures below show the communication function across three activities:

Figure 6: Total Pre- and Post-Initiations Across Behaviour Regulation (n=1 Albeshri)

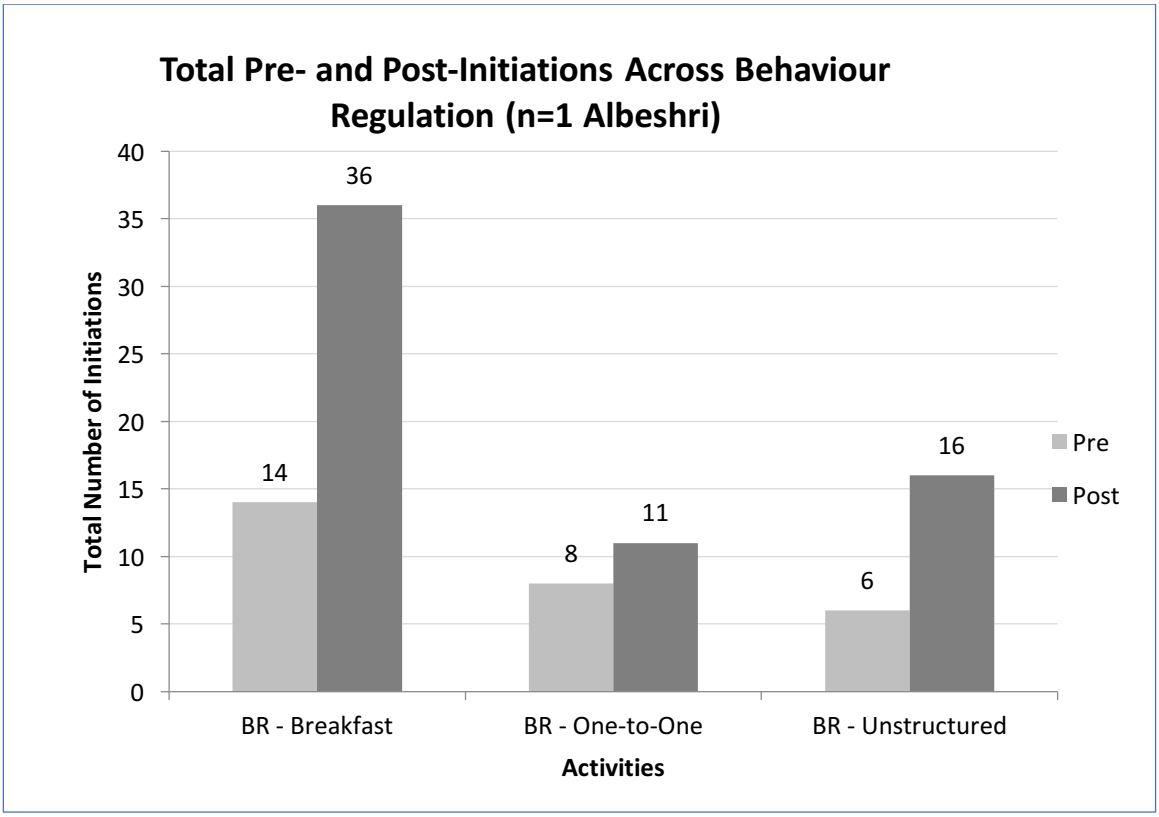


Figure 7: Total Pre- and Post-Initiations Across Joint Attention (n=1 Albeshri)

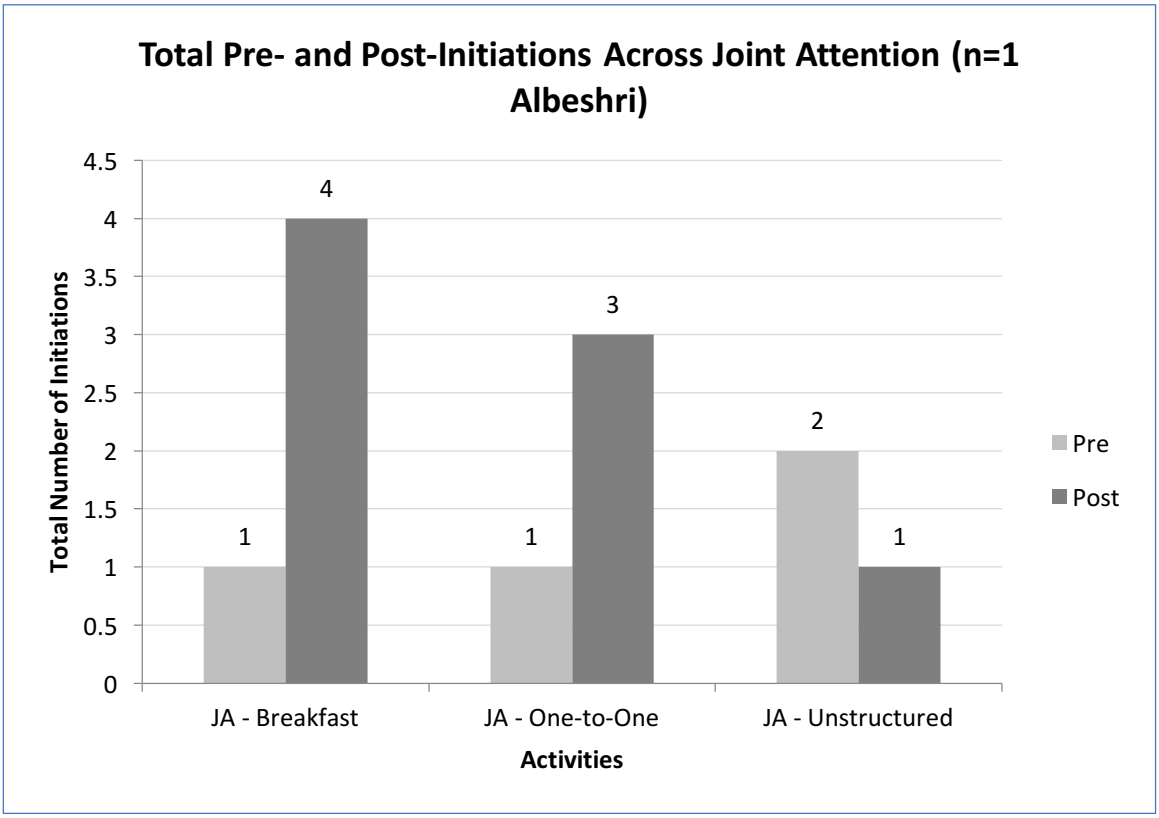
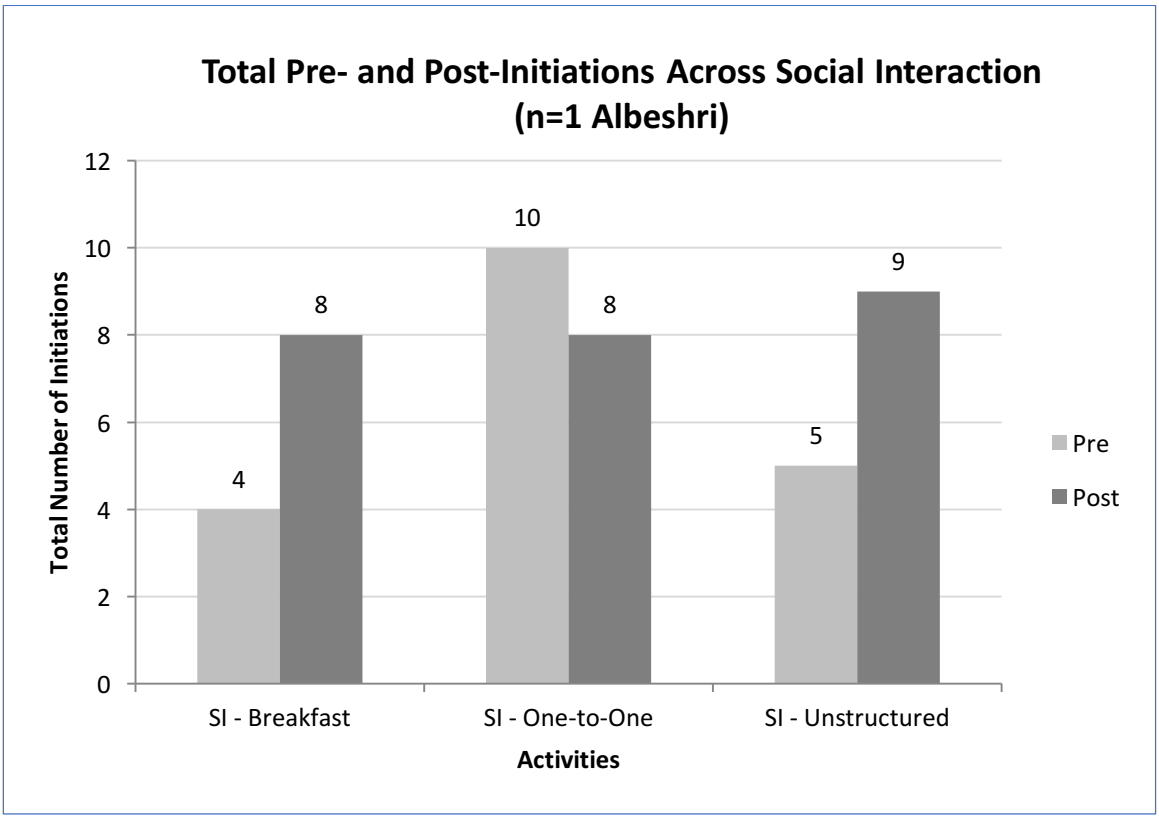


Figure 8: Total Pre- and Post-Initiations Across Social Interaction (n=1 Albeshri)



Case study—Ali

This section reports the pre- and post-intervention findings for Ali, one male autistic child, aged five years at pre-intervention (see *Table 4*). *Table 5* and *Figure 9* summarise the frequency of pre- and post-intervention communication initiations made by Ali, including his total spontaneous communication.

Table 4: Baseline details for case study (Ali, n=1) (Pre-intervention)

Child (name changed)	**Ali**
Sex	Male
Age at pre-intervention assessment (in years)	5 years
Diagnosis	Autism
CARS score	41
Level of verbal communication	Vocalisations
Level of initiation of communication	Based on school observations conducted for this study, and reports by staff, Ali usually initiated communication with adults/teachers.

Table 5: Frequency of initiations, pre- and post-intervention (Ali, n=1)

CATEGORY	**Pre *(n)***	**Post *(n)***	**Change Score[1]**
INITIATIONS BY ACTIVITY			
Breakfast	38	59	21
One-to-One	32	50	18
Unstructured	31	53	22
INITIATIONS BY COMMUNICATIVE FUNCTION			
Total Behaviour Regulation (BR)	44	60	16
BR during Breakfast	22	36	14
BR during One-to-One	10	11	1
BR during Unstructured	11	13	2
Total Joint Attention (JA)	7	18	11
JA during Breakfast	2	4	2
JA during One-to-One	1	7	6
JA during Unstructured	4	8	4
Total Social Interaction (SI)	51	83	32
SI during Breakfast	14	19	5
SI during One-to-One	21	32	11
SI during Unstructured	16	32	16
INITIATIONS BY COMMUNICATIVE METHOD			

Request	20	42	22
Reject/Protest	23	18	-5
Comment/Give Information	7	17	10
Seek Information	0	2	2
Express Feelings	49	67	18
Seek Attention	2	15	13
Seek Approval	0	0	0
Social Routines	0	1	1
Social Games	0	0	0

[1]*Note.* Change score is calculated from pre- and post-intervention data

Table 5 lists the type and frequency of communication initiations by Ali while performing three activities. The activities (breakfast, one-to-one, and unstructured) were of 40 minutes' duration each and were recorded during an observation period of two hours pre- and post-intervention. It can be seen that for most forms of behaviour there were significant positive changes in initiations of communication. The data strongly confirms the positive effects of the intervention on Ali's ability to initiate communications in a range of situations using a range of communicative functions. 'Request' was most significantly increased communication function, especially during the breakfast activity. It appears that this is because his staff member changed her style, giving the child small portions rather than whole portion and in this way encouraging Ali to make requests more often. Interestingly, 'seek attention' was also considerably changed, as he initiated twice pre-intervention but

initiated often post-intervention. Social games also more than doubled. Expressing his feeling also increased markedly. With regards to the activities, Ali made the most initiations during unstructured free play, followed by Breakfast, then 1:1. Ali is quite active, and positive effects were evident in the post-intervention stage.

Figure 9: Total Pre–Post Initiations Across Communicative Functions (Ali, n=1)

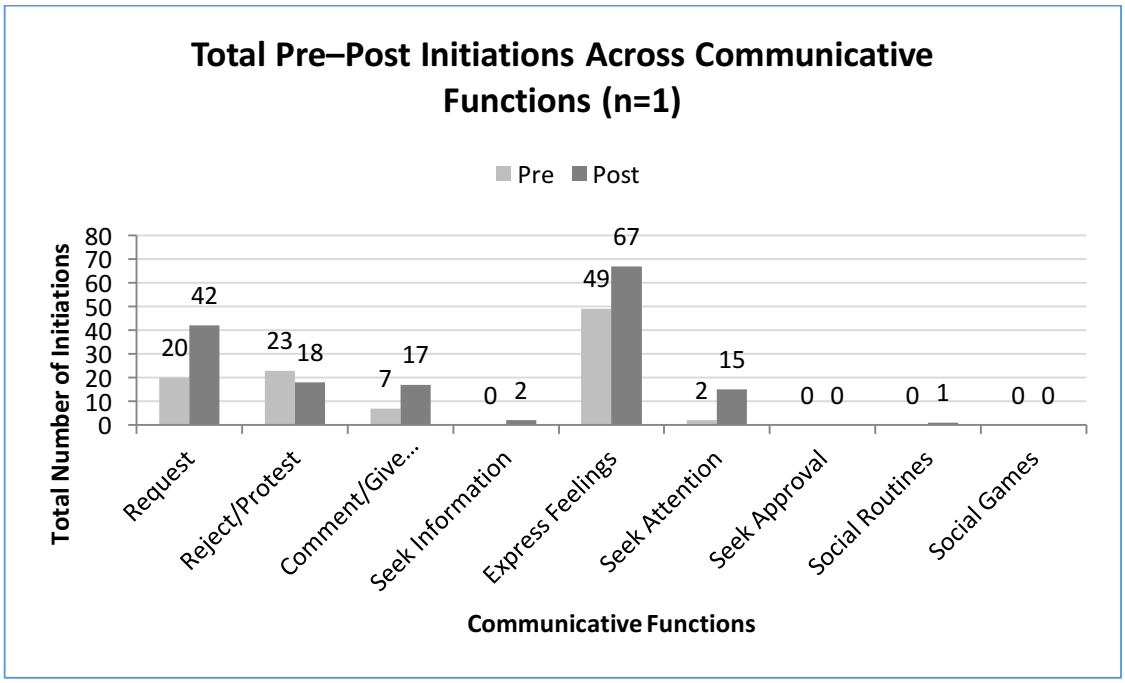


Figure 9 shows the frequency of Ali's initiations across nine communicative functions, pre- and post-intervention. It clearly shows which communication functions have increased/decreased, or remain unchanged (indicated by 0). As noted earlier, Ali showed the greatest post-intervention increases in making requests. This was followed by increases in expressing feelings, seeking attention, and commenting/giving information. In contrast, initiations for seeking approval or social games were unchanged; and there was a minimal

increase in initiations for social routines and seeking information. Interestingly, the only communicative function which decreased was reject/protest.

Table 6: Frequency of initiations for communication methods: pre-symbolic and symbolic, pre- and post-intervention (Ali, n=1)

PRE-SYMBOLIC MEANS	**Pre**	**Post**	**Change Score[1]**
Challenging Behaviour	7	13	6
Eye Contact	5	11	6
Eye Pointing	0	3	3
Laugh	3	6	3
Point	2	12	10
Proximity/Touch	11	12	1
Re-enactments	0	0	0
Simple Motor Actions	27	31	4
Smile	6	9	3
Vocalisations/Babbling	27	35	8
Other:	0	0	0
SYMBOLIC MEANS			
Delayed Echolalia	0	0	0
Immediate Echolalia	0	0	0
Object of Reference	0	0	0
Single Words	0	0	0
Signs/Gestures	0	6	6
Symbols/Pictures	13	25	12
Word Combinations	0	0	0
Other:	0	0	0

[1]*Note.* Change score is calculated from post–pre intervention data

Table 6 above records the changes in the type and frequency of pre-symbolic and symbolic methods of communication recorded during observation periods of two hours duration. Ali demonstrated increased usage of vocalisations and simple motor actions in both phases: the most increased functions post-intervention are use of pictures, pointing, and eye contact.

Some forms of communication remained unused, such as echolalia. He increased his challenging behaviour post-intervention.

For Ali, the changes between pre- and post-intervention communicative attempts for the three functions differed in each of the individual activities. Most of his initiations – 22 pre-, 36 post-intervention – occurred during breakfast, compared to the 1:1 activities (10 pre-, 11 post-intervention) and unstructured activities (11 pre-, 13 post-intervention). The frequency of his communication attempts varied in the case of joint attention as well, where the biggest change – 1 initiation pre-, 7 post-intervention, i.e. an increase of 6 attempts – occurred during the 1:1 activities, with the unstructured activities showing the second biggest change – from 4 initiations pre- to 8 post-intervention, i.e. double the number. The smallest number of communicative attempts in the joint attention activities was recorded during breakfast, increasing from 2 pre- to 4 post-intervention (see *figure 15*). As for social interaction (see *figure 16*), the change from pre- to post-intervention was most significant in the case of unstructured activities (from 16 initiations pre- to 32 post-intervention, i.e. double the number), followed by 1:1 activities (21 initiations pre-, 32 post-intervention, i.e. an increase of 11), and breakfast which, again, showed the smallest change (14 initiations pre-, 19 post-intervention, i.e. an increase of 5).

Figure 10: Total Pre– and Post-Intervention Initiations Across Pre-Symbolic Communication Methods (n=1)

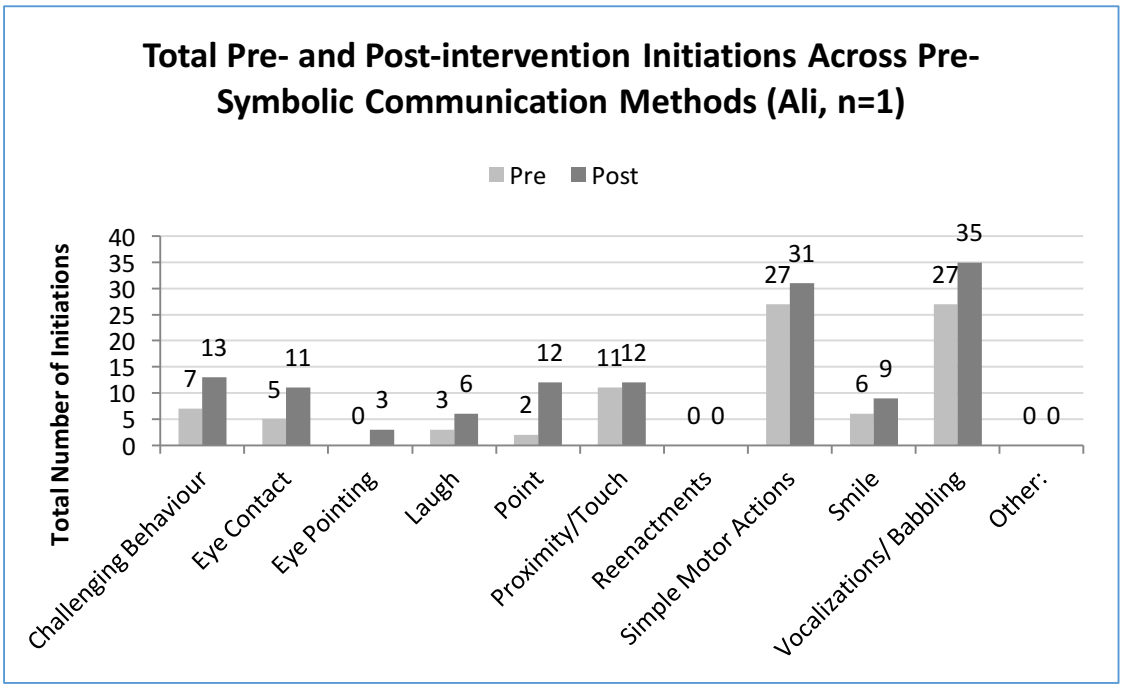


Figure 10, above, shows the pre- and post-intervention frequency for initiations across pre-symbolic communicative methods. It shows that the greatest increase made by Ali was for pointing, followed by vocalisation/babbling, then challenging behaviour which should decrease after implementing AISI intervention, and eye contact. Smaller increases were observed in Ali using a few more simple motor actions: eye pointing, laughter, smiles, and proximity/touch; however, re-enactments remained unchanged. These results suggest the teacher training intervention had a positive impact, helping Ali to communicate his needs more effectively to his teacher. People typically use pointing and vocalising to capture the attention of others, and Ali began to use these more frequently. With regards to CB, the child became very upset and anxious when his staff used the communication opportunities of 'forget something vital' and 'give the child non-preferred items': e,g. at breakfast, the

staff gave the child milk rather than his favourite juice, and the child become very upset because he could see the juice that he actually wanted.

Figure 11: Total Pre- and Post-intervention Initiations Across Symbolic Communication Methods (Ali, n=1)

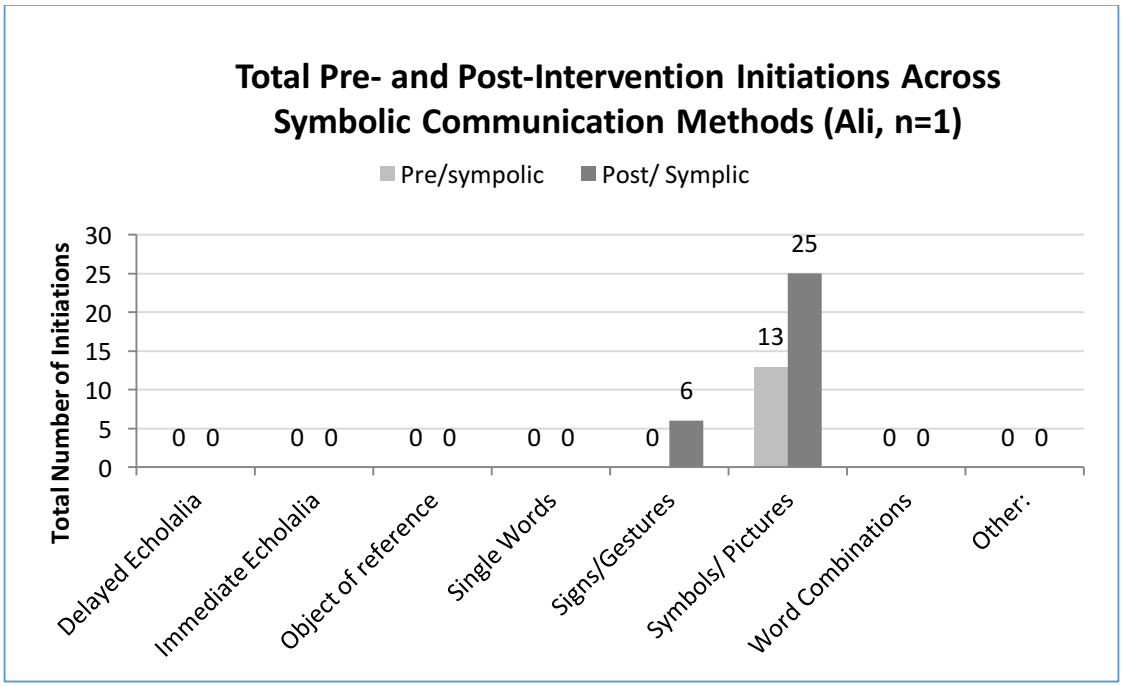


Figure 11, above, illustrates the pre- and post-intervention frequency of communication initiations made by Ali across seven symbolic communicative methods. Only Ali's use of symbols/pictures, followed by signs/gestures, increased post-intervention, whereas five other symbolic communicative methods were unchanged – they were not used by Ali either pre- or post-intervention. Thus the intervention had a positive impact on encouraging Ali to use symbols/pictures to communicate more with his teacher, but made no other notable impact on his methods of communication. This was particularly noticeable during breakfast,

as Ali used double the number of symbols/pictures to request more food post-intervention: he used 13 symbols/pictures at pre- and 25 at post-intervention.

Figure 12: Total initiation across activities pre-and post intervention (Ali, n=1)

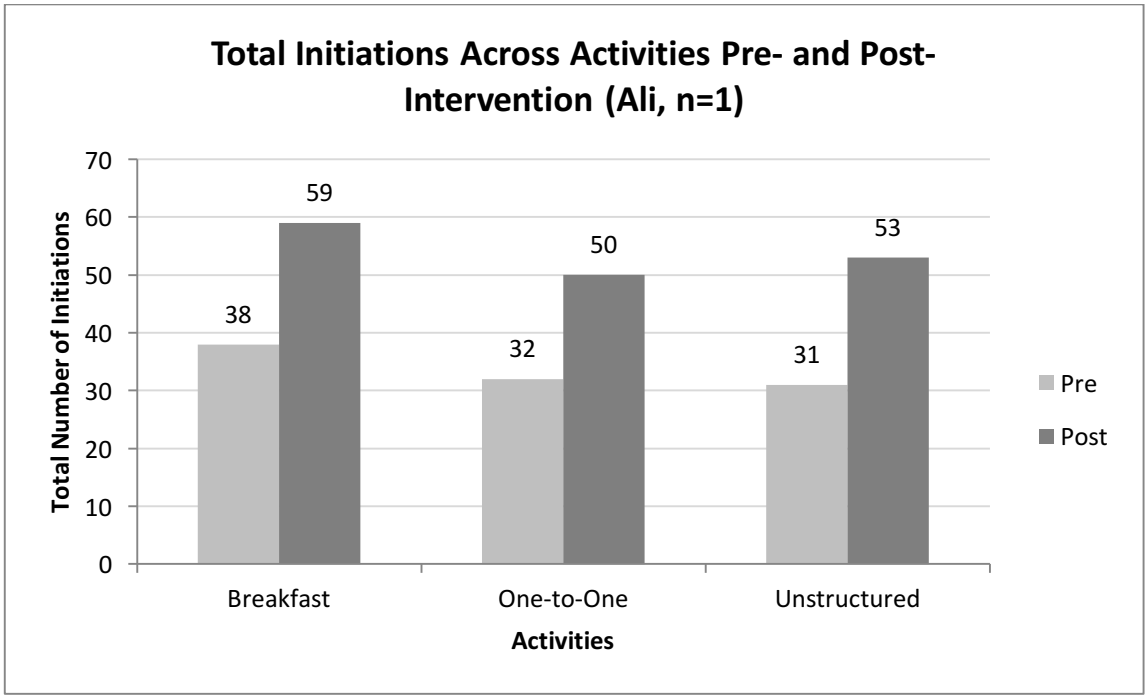


Figure 12, above*,* shows the frequency of Ali's initiations pre- and post-intervention with his teacher during three activities (breakfast, one-to-one, and unstructured). The number of initiations increased within all three activities post-intervention. The greatest increase was in unstructured activity (an increase of 22 initiations, from 31 pre- to 53 post-intervention). This was followed by breakfast (an increase of 21 initiations, from 38 to 59); and one-to-one (an increase of 18 initiations, from 32 to 50). Thus, for Ali, the teacher training intervention was most effective for improving his spontaneous communication initiation during

unstructured activities, and he also communicated more during breakfast and one-to-one time.

Figure 13: Total Pre- and Post-intervention Initiations Across Communicative Functions (Ali, n=1)

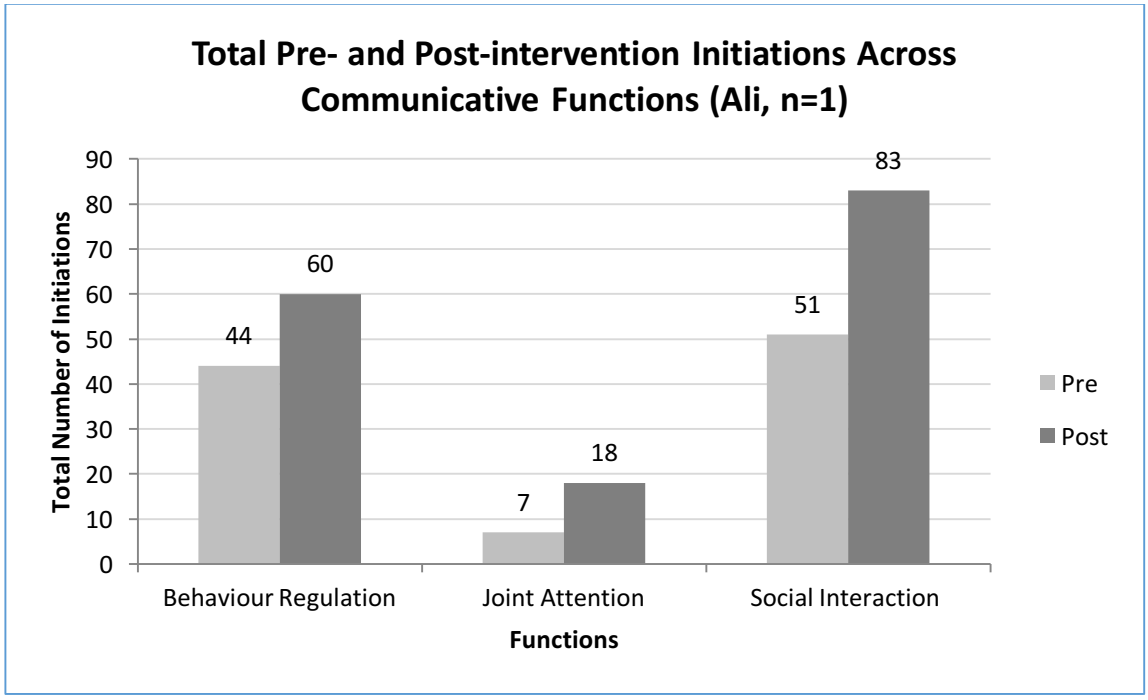


Figure 13, above, shows the increased number of initiations after the intervention, across all three communicative functions. The greatest increase was observed for social interaction: Ali made 32 more attempts to communicate socially (from 51 pre- to 83 post-intervention). Ali also made 16 more initiations for behaviour regulation post-intervention, (from 44 to 60). However, he started from a low base and more than doubled these initiations: the change in initiations for joint attention was from 7 pre-intervention to 18 post-intervention, so it was actually a fairly significant change. Thus, the AISI seems to have been successful in helping Ali to communicate more regarding social interaction, and least effective in increasing initiations for joint attention.

The three figures below show that the frequencies of communication function across three activities:

Figure 14: Pre–Post Initiations for Behaviour Regulation Across Activities (n=1)

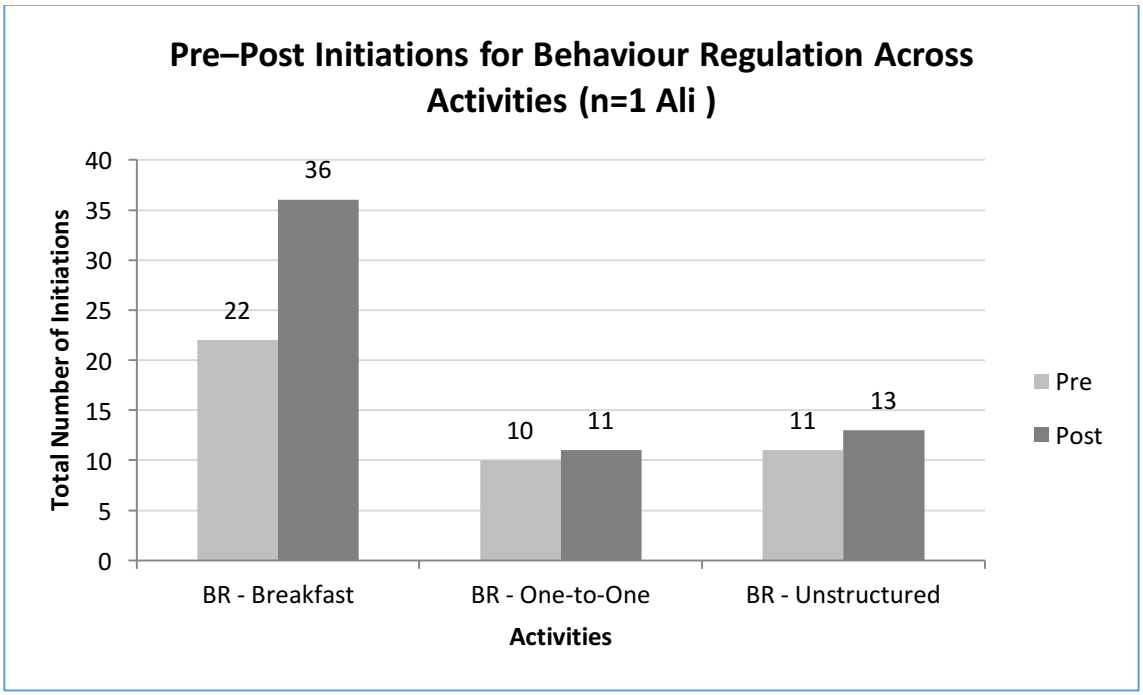


Figure 15: Pre–Post Initiations for Joint Attention Across Activities (n=1)

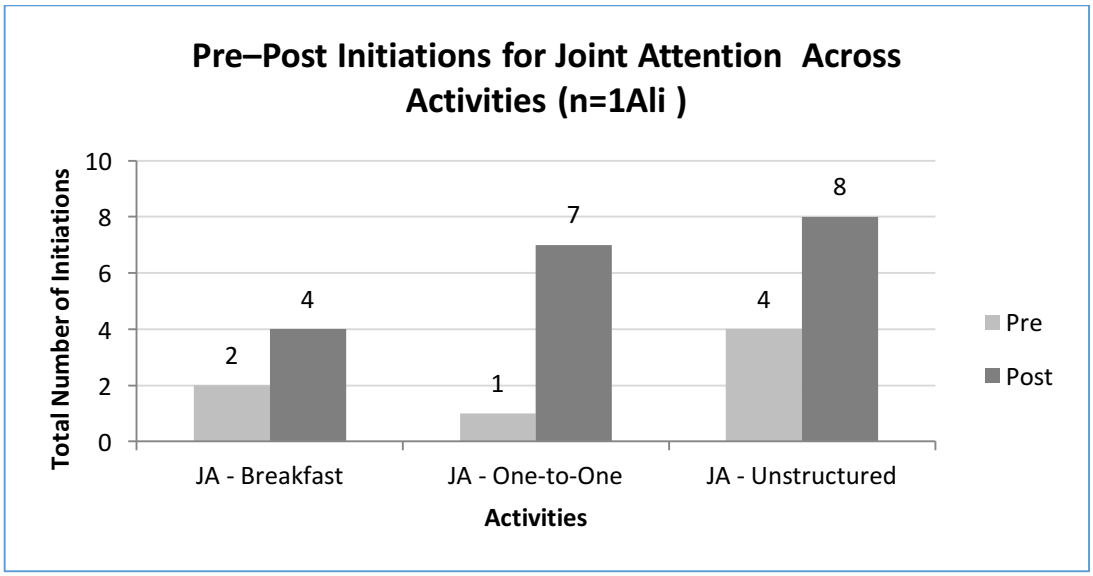
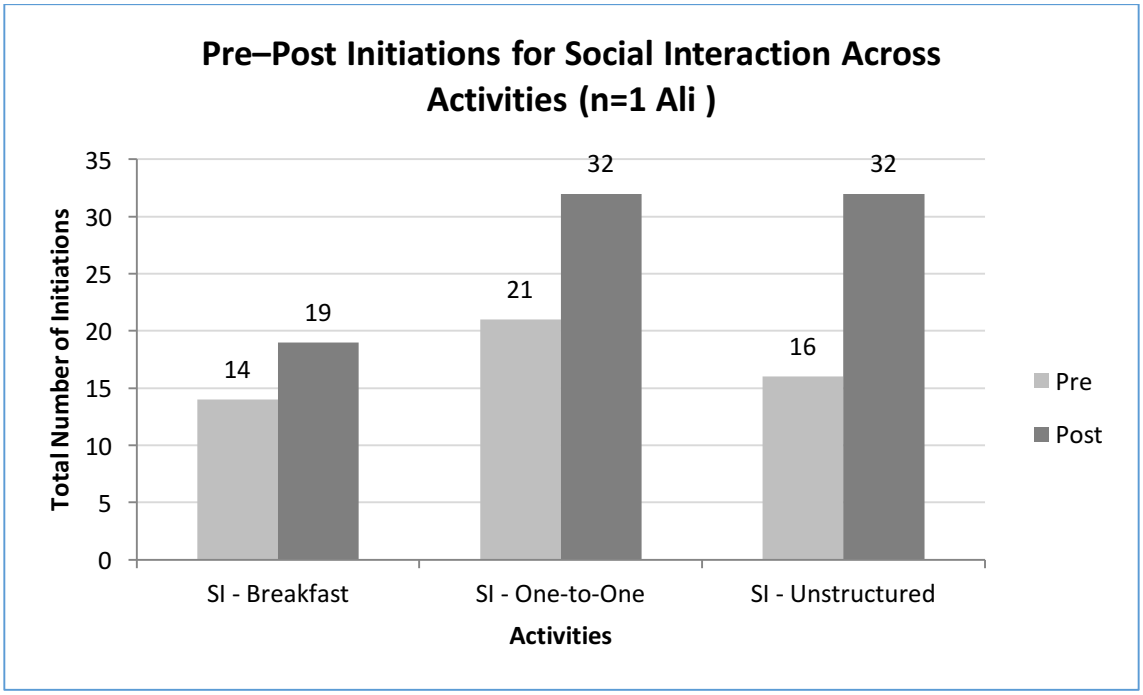


Figure 16: Pre–Post Initiations for Social Interaction Across Activities (n=1)



Case study—Balbaid

This section reports the pre- and post-intervention findings for Balbaid, a child aged seven years at pre-intervention (see *Table 7*, below), to evaluate the impact of a two-month Saudi teacher training intervention using AISI principles for facilitating autistic children's spontaneous communication. *Table 8* summarises the frequency of pre- and post-intervention initiations made by Balbaid.

Table 7: Baseline details for case study (Balbaid, n=1) (Pre-intervention)

Child (Name changed)	**Balbaid**
Sex	Male
Age at pre-intervention assessment (in years)	7 years
Diagnosis	Severe Autism
CARS score	51.5
Level of verbal communication	Vocalisation
Level of initiation of communication	Based on school observations conducted for this study, and reports by staff, he very rarely initiates communication with adults and does not initiate communication with other children. His ability of communication is low

Table 8: Frequency of initiations, pre- and post-intervention (Balbaid, n=1)

CATEGORY	**Pre *(n)***	**Post *(n)***	**Change Score[1]**
INITIATIONS BY ACTIVITY			
Breakfast	11	31	20
One-to-One	12	29	17
Unstructured	14	29	15
INITIATIONS BY COMMUNICATIVE FUNCTION			
Total Behaviour Regulation (BR)	19	41	22
BR during Breakfast	9	23	14
BR during One-to-One	6	8	2
BR during Unstructured	4	10	6
Total Joint Attention (JA)	2	6	4
JA during Breakfast	0	1	1
JA during One-to-One	1	2	1
JA during Unstructured	1	3	2
Total Social Interaction (SI)	16	42	26
SI during Breakfast	2	7	5
SI during One-to-One	5	19	14
SI during Unstructured	9	16	7
INITIATIONS BY COMMUNICATIVE METHOD			

Request	17	37	20
Reject/Protest	2	4	2
Comment/Give Information	2	6	4
Seek Information	0	0	0
Express Feelings	13	19	6
Seek Attention	0	13	13
Seek Approval	0	0	0
Social Routines	0	1	1
Social Games	3	9	6

Table 9: Frequency of initiations for communication methods: pre-symbolic and symbolic, pre- and post-intervention (Balbaid, n=1)

PRE-SYMBOLIC MEANS	**Pre**	**Post**	**Change Score[1]**
Challenging Behaviour	0	0	0
Eye Contact	2	7	5
Eye Pointing	0	0	0
Laugh	4	0	-4
Point	6	14	8
Proximity/Touch	5	3	-2
Re-enactments	0	0	0
Simple Motor Actions	6	10	4
Smile	0	1	1
Vocalisations/Babbling	5	17	12
Other:	0	0	0
SYMBOLIC MEANS			
Delayed Echolalia	0	0	0
Immediate Echolalia	0	0	0
Object of Reference	0	2	2
Single Words	0	0	0
Signs/Gestures	1	1	0
Symbols/Pictures	8	18	10
Word Combinations	0	0	0
Other:			

[1]*Note.* Change in score is calculated as the difference between the initiations before and after the intervention.

Table 8 lists the type and frequency of communication initiations by Balbaid while performing three activities. The activities (breakfast, one-to-one, and unstructured) were of 40 minutes' duration each and were recorded during an observation period of two hours pre- and post-intervention. It can be seen that for most forms of behaviour there were significant positive changes in initiations of communication, strongly confirming the positive effects of the intervention on Balbaid's ability to initiate communications in a range of situations using a range of communicative functions. 'Request' was the function most significantly

increased, and the change between pre- and post-intervention phases was 20. Interestingly, seeking attention was considerably changed as he never initiated this form of communication pre-intervention but initiated it often post-intervention. Communication focused on social games also more than doubled.

With regards to the activities, Balbaid initiated communication most frequently during the breakfast activity, followed by 1:1 and Unstructured free play. Importantly, *Table 8* demonstrates the significant impact the intervention had on his communication in all of the activities. During breakfast, Balbaid was encouraged to initiate communication. This is particularly important, as he was most animated at that time and showed an increase from 11 to 31. This clearly shows that the number of his communication attempts more than doubled as a result of the staff's application of the AISI principles, particularly when giving the child an insufficient portion of food or putting him into a situation when felt the urge to ask for help.

As for communication for joint attention, it was also possible to observe positive impacts of the intervention. Cumulatively, the number of communicative attempts for joint attention reached a relatively small amount, and the majority of them were recorded post-intervention. Regarding communication for social interaction during the activities, *Table 8* shows that the impact of the intervention was noticeable. During all of the functions, social interaction proved to be a strong stimulus for Balbaid to attempt to initiate communication. Furthermore, it is important to mention that the number of initiations increased significantly—during breakfast they tripled, whilst during 1:1 activities, they reached approximately four times the original value. Even though breakfast was the time when he

was more animated and active, the records show an increase of communicative attempts in social interaction even during other daily activities.

Table 9 above records changes in the type and frequency of pre-symbolic and symbolic methods of communication recorded during observation periods of two hours' duration. Balbaid demonstrated increased usage of vocalisations, pictures, pointing, and eye contact, but eight forms of communication remained unused. Two aspects of communication–laughing and smiling–remained little used as he is very quiet. He did not use any echolalia.

Figure 17: Total Pre- and Post-Intervention Initiations Across Communicative Functions (Balbaid, n=1)

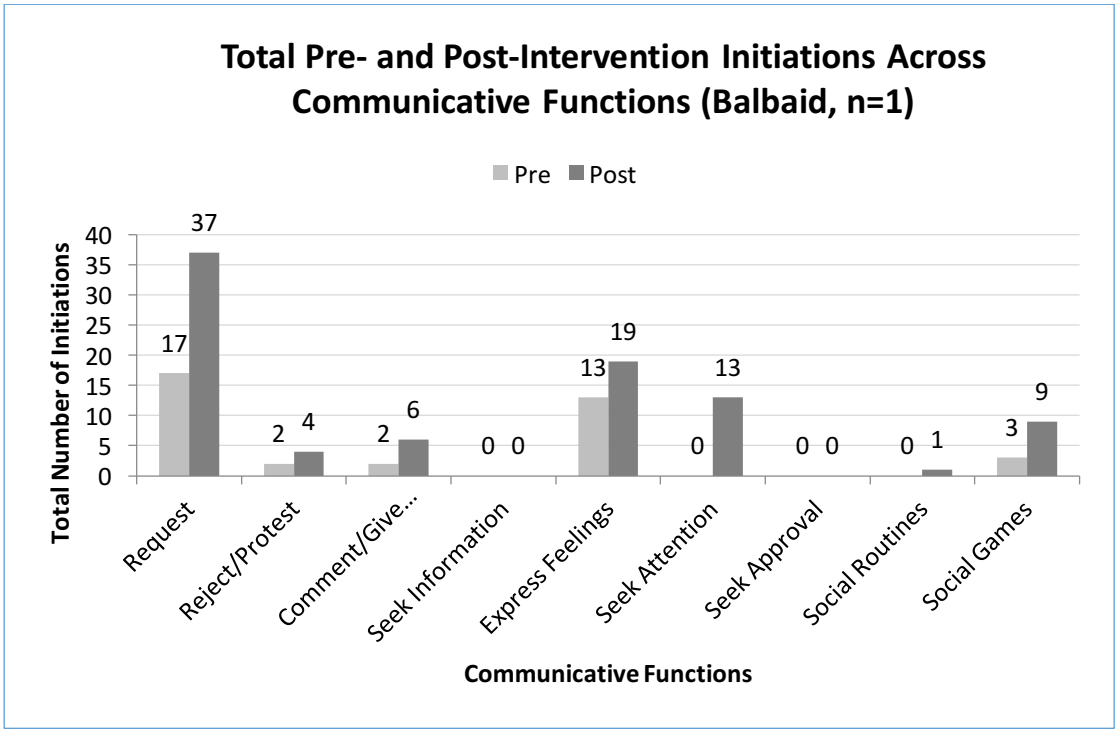


Figure 17 illustrates that while Balbaid exhibited overall greater willingness and ability to initiate communications, the initiations were confined to a few specific forms, in particular

making requests, which considerably increased post-intervention. Expressing his feelings, seeking attention, and social games also increased post-intervention. It is also pertinent to note that many functions were unused, or remained little-used, depending on the situation.

Figure 18: *Pre- and post-intervention use of symbolic communicative methods*

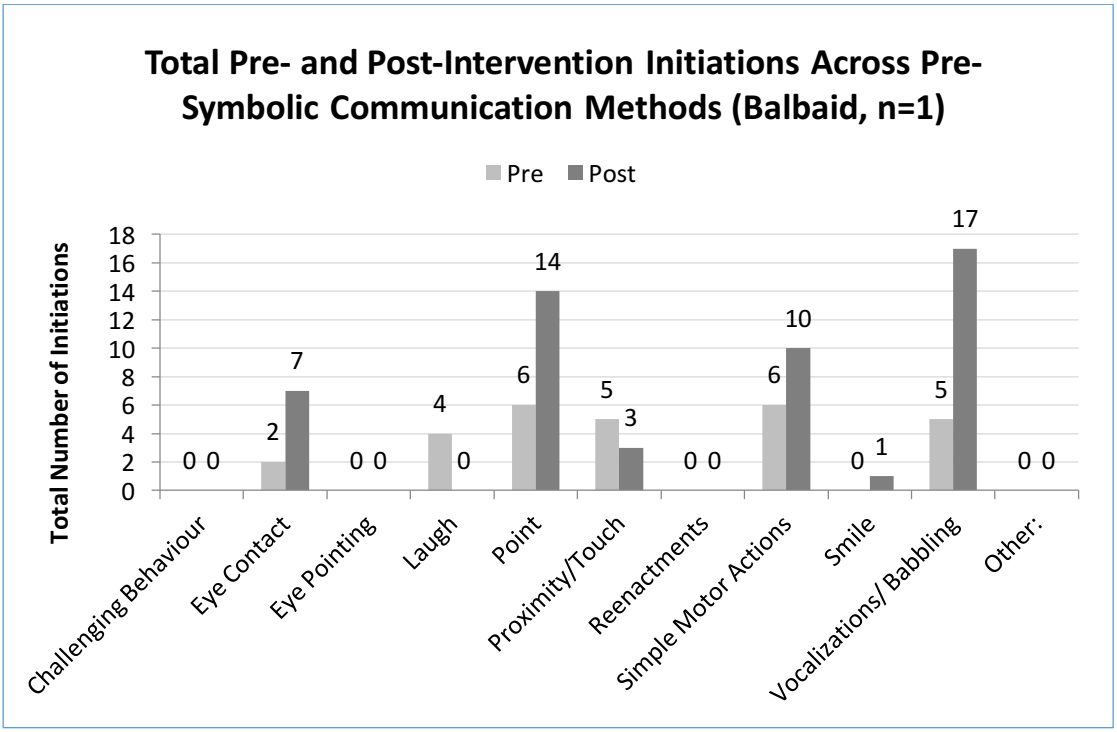
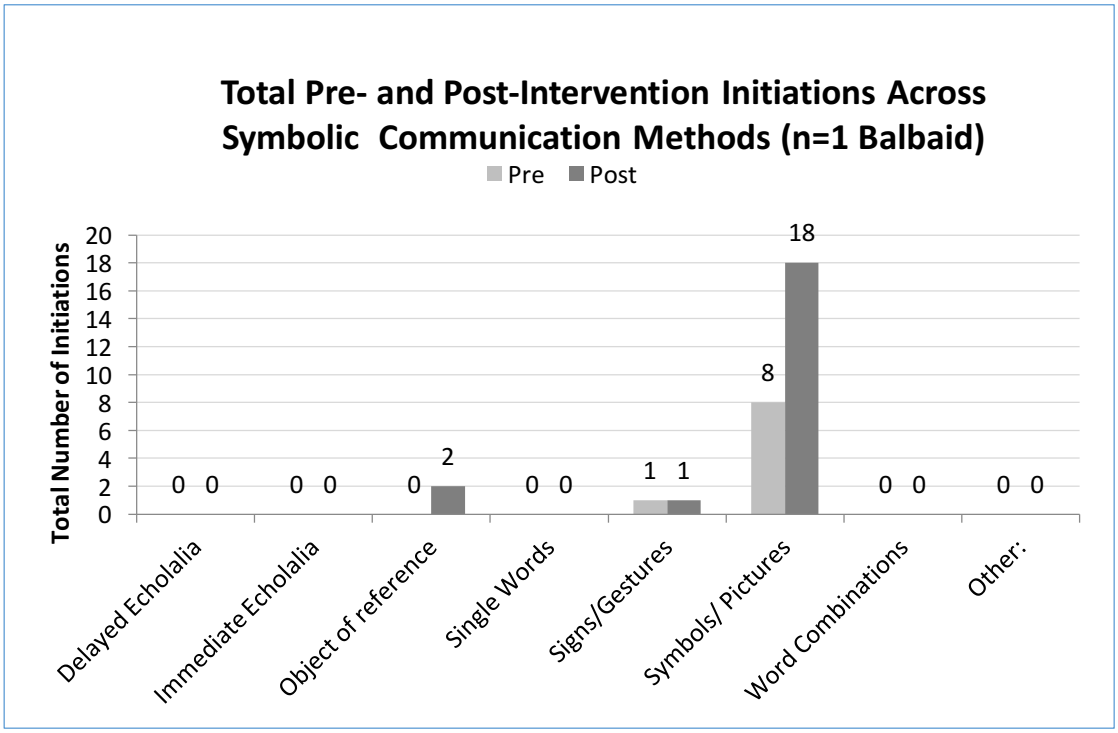


Figure 18 illustrates the generally positive effects of the intervention, reflected in the changes in initiations. A noticeable feature is the strong increases in frequency for pointing, eye contact, simple actions, and vocalisations. Equally pertinent is that four communicative functions remained unused. Interestingly, Balbaid's level of challenging behaviour stabilised, which may reflect his improved facility with other forms of spontaneous communication.

Figure 19: Symbolic communicative methods



While the overall effects of the intervention are apparent in the preceding charts, *Figure 19*, above, illustrates that Balbaid used a very limited range of symbolic communication methods. He exhibited a strong preference for using pictures, and the frequency of initiations more than doubled. However, it is pertinent to note that seven of the eight categories of symbolic methods remained little-used or unused.

Figure 20: Total Initiations Across Activities Pre- and Post- Intervention (n=1 Balbaid)

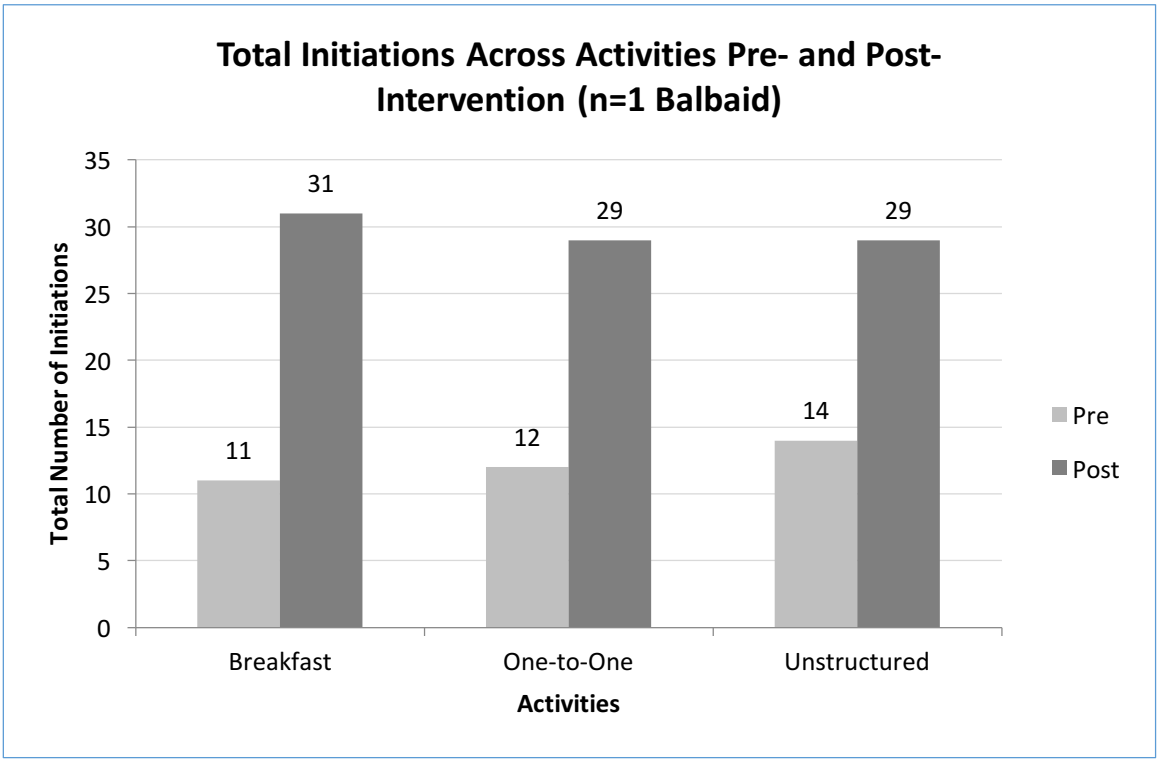
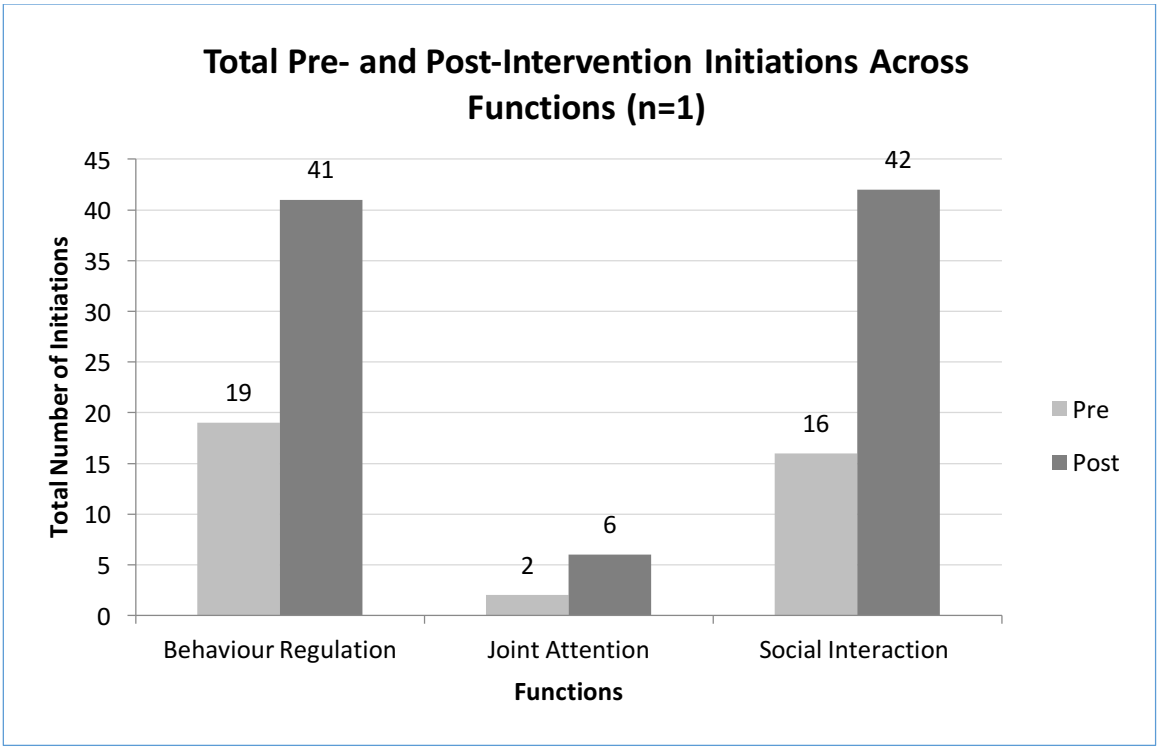


Figure 20, above, provides strong support for the positive effects of the intervention, and it is interesting to note that Balbaid's communication initiations increased considerably despite the fact that his communication ability is very low. The increased number of initiations was fairly uniform during all three periods of activity, though slightly higher during breakfast.

Communicative functions: behaviour regulation, joint attention, and social interactions

Figure 21: Total Pre- and Post-Intervention Initiations Across Functions (n=1 Balbaid)



The results of the intervention are illustrated quite markedly in *Figure 21*. It can be seen that the frequency of initiations more than doubled for both behaviour regulation and social interaction, and while Balbaid communicated much less for joint attention, even this function increased three-fold.

The three Figure below show the communication function across three activities:

Figure 22: Total Pre- and Post-Intervention Initiations Across Behaviour Regulation (n=1 Balbaid)

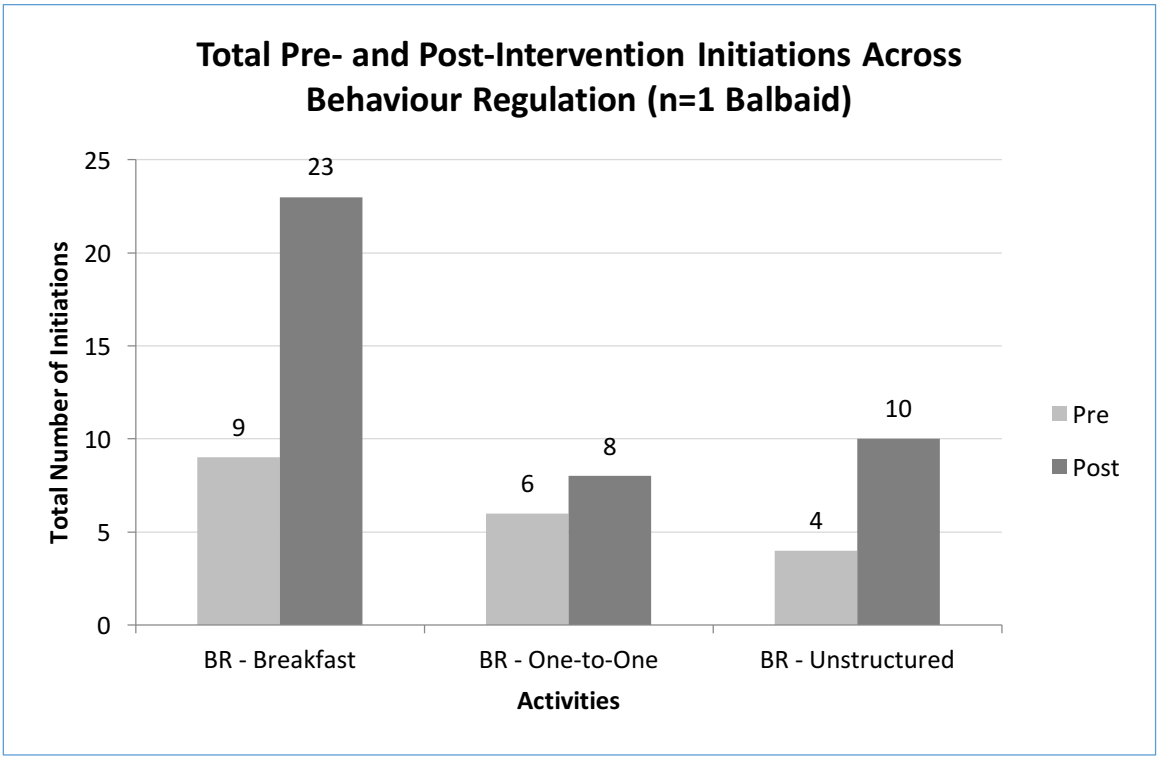


Figure 23: Total Pre- and Post-Intervention Initiations Across Joint Attention (n=1 Balbaid)

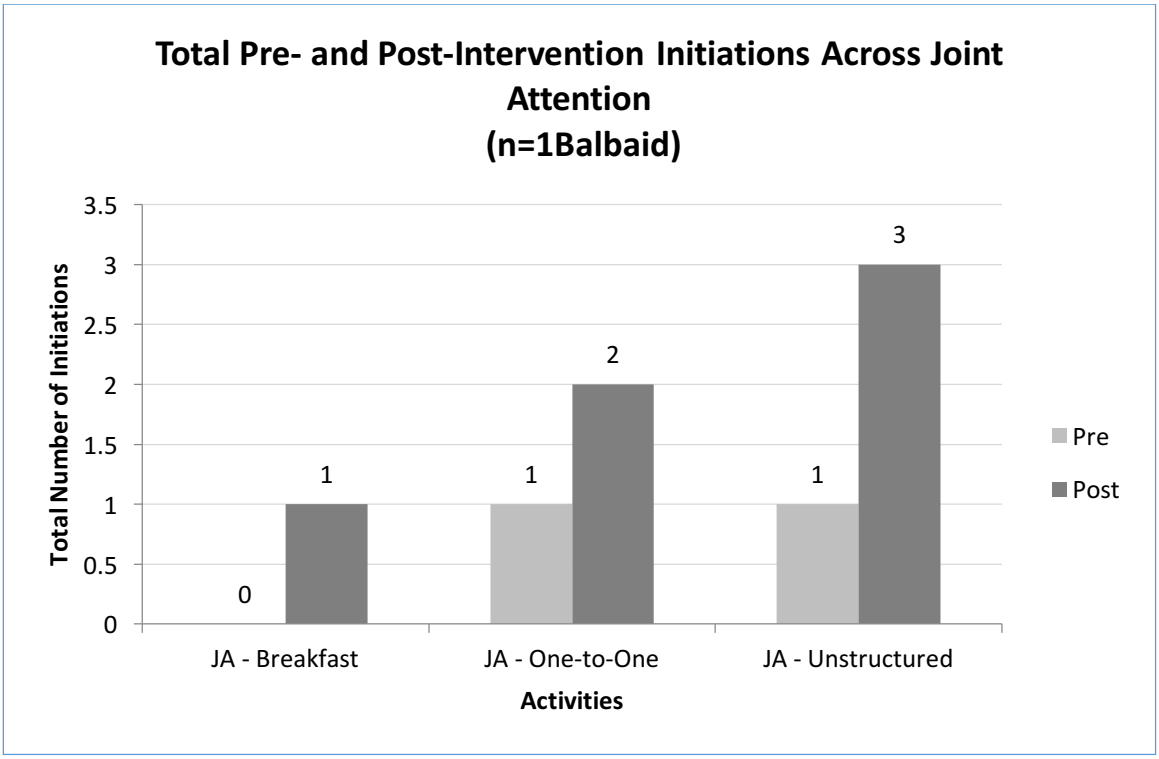
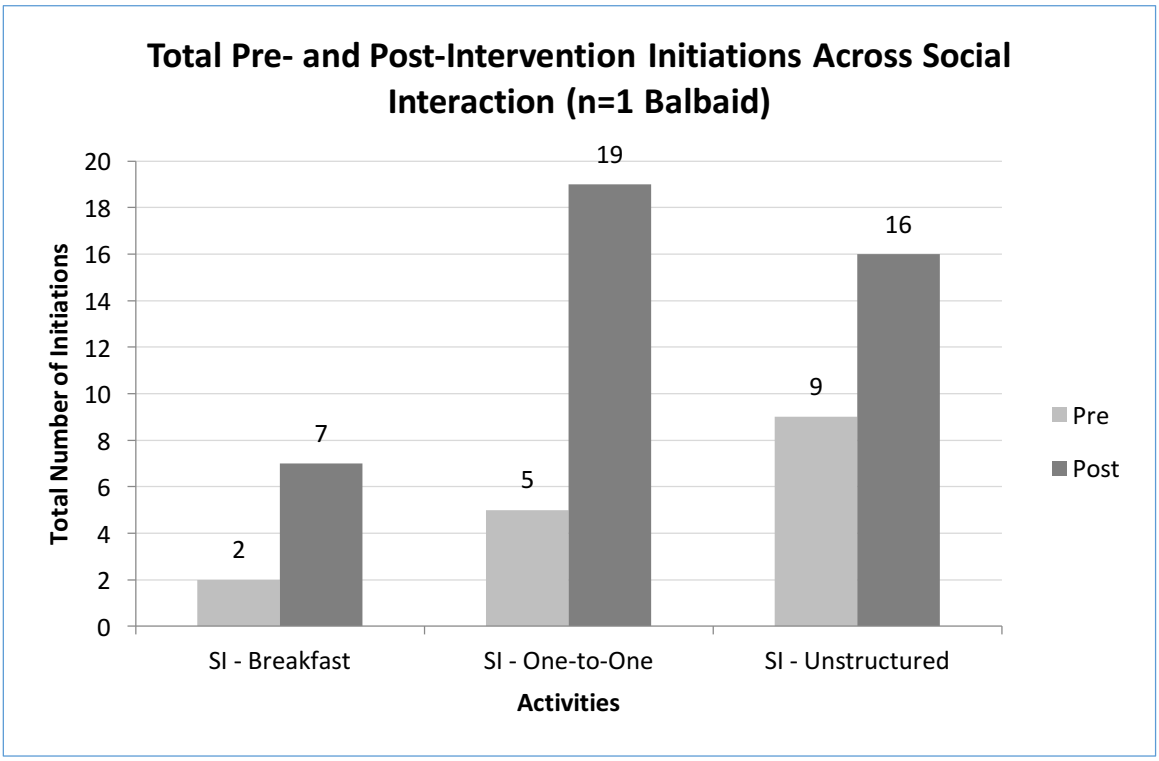


Figure 24: Total Pre- and Post-Intervention Initiations Across Social Interaction (n=1 Balbaid)



Case study: Bashawri

This section reports the pre- and post-intervention findings for Bashawri, a child aged six years at pre-intervention *(see table 10). Table 11 and Figure 25* summarise the frequency of pre- and post-intervention initiations made by Bashawri.

Table 10: Baseline details for case study (Bashawri, n=1) (Pre-intervention)

Child (Name changed)	**Bashawri**
Sex	Male
Age at pre-intervention assessment (in years)	6 years
Diagnosis	Autism
CARS score	45 (severe autism)
Level of verbal communication	Vocalisation
Level of initiation of communication	Based on school observations conducted for this study, and reports by staff, sometimes he initiates communication with adults during play and breakfast, using symbols and pictures.

Table 11: Frequency of initiations, pre- and post-intervention (Bashawri, n=1).

CATEGORY	**Pre *(n)***	**Post *(n)***	**Change Score**
INITIATIONS BY ACTIVITY			
Breakfast	20	36	16
One-to-One	16	26	10
Unstructured	15	28	13
INITIATIONS BY COMMUNICATIVE FUNCTION			
Total Behaviour Regulation (BR)	25	44	19
BR during Breakfast	12	26	14
BR during One-to-One	8	7	-1
BR during Unstructured	5	11	6
Total Joint Attention (JA)	3	3	0
JA during Breakfast	0	0	0
JA during One-to-One	2	2	0
JA during Unstructured	1	1	0
Total Social Interaction (SI)	23	43	20
SI during Breakfast	8	10	2
SI during One-to-One	6	17	11
SI during Unstructured	9	16	7
INITIATIONS BY COMMUNICATIVE METHOD			

Request	14	36	22
Reject/Protest	7	8	1
Comment/Give Information	3	3	0
Seek Information	0	0	0
Express Feelings	19	26	7
Seek Attention	2	7	5
Seek Approval	2	6	4
Social Routines	0	2	2
Social Games	0	2	2

Table 12: Frequency of initiations for communication methods: pre-symbolic and symbolic, pre- and post-intervention (Bashawri, n=1)

PRE-SYMBOLIC MEANS	Pre	Post	Change Score[1]
Challenging Behaviour	0	0	0
Eye Contact	7	12	5
Eye Pointing	0	3	3
Laugh	0	0	0
Point	2	11	9
Proximity/Touch	2	8	6
Re-enactments	0	0	0
Simple Motor Actions	11	17	6
Smile	3	2	-1
Vocalisations/Babbling	18	24	6
Other:	0	0	0
SYMBOLIC MEANS			
Delayed Echolalia	0	0	0
Immediate Echolalia	0	0	0
Object of Reference	0	0	0
Single Words	0	0	0
Signs/Gestures	1	2	1
Symbols/Pictures	7	11	4
Word Combinations	0	0	0
Other:			

[1]*Note.* Change in score is calculated as the difference between the initiations before and after the intervention.

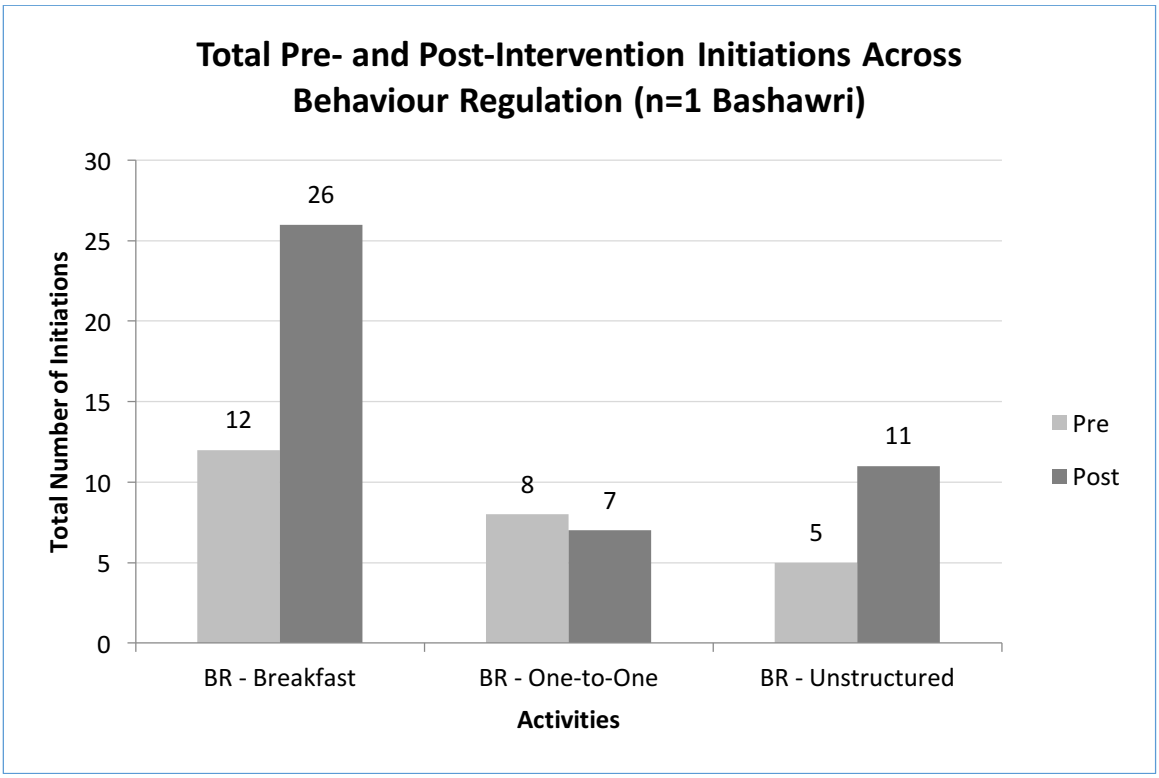
Table 11, above, lists the type and frequency of communications initiated by Bashawri while performing three activities. The activities (breakfast, one-to-one, and unstructured) were of 40 minutes' duration each and recorded during an observation period of two hours. It can be seen that for most forms of behaviour there were positive changes in initiations of communication. In case of this child, an apparent increase in the number of communicative attempts was observed, resulting in behaviour regulation. For the major part, it occurred during breakfast – the child was stimulated and active, and attempted to express his choice of particular food. The number of his communication attempts also increased during the

unstructured activities, often using gestures (i.e. pointing) and vocalisation. Although a slight decrease was recorded during the 1:1 activities, the overall positive impact of the intervention was unquestionable.

The majority of the children participating in this research showed only a small number of communication attempts related to joint attention. The impact of intervention in joint attention was insignificant in case of Bashawri (Figure 25). It should be emphasised that no initiations occurred during breakfast despite him being at his most active and animated during this activirt. Overall, however, the intervention had positive impact on Bashawri's initiation of social interactions (see*, Figure26*). Most of his communication attempts occurred during the two other activities, i.e. 1:1 and unstructured activities.

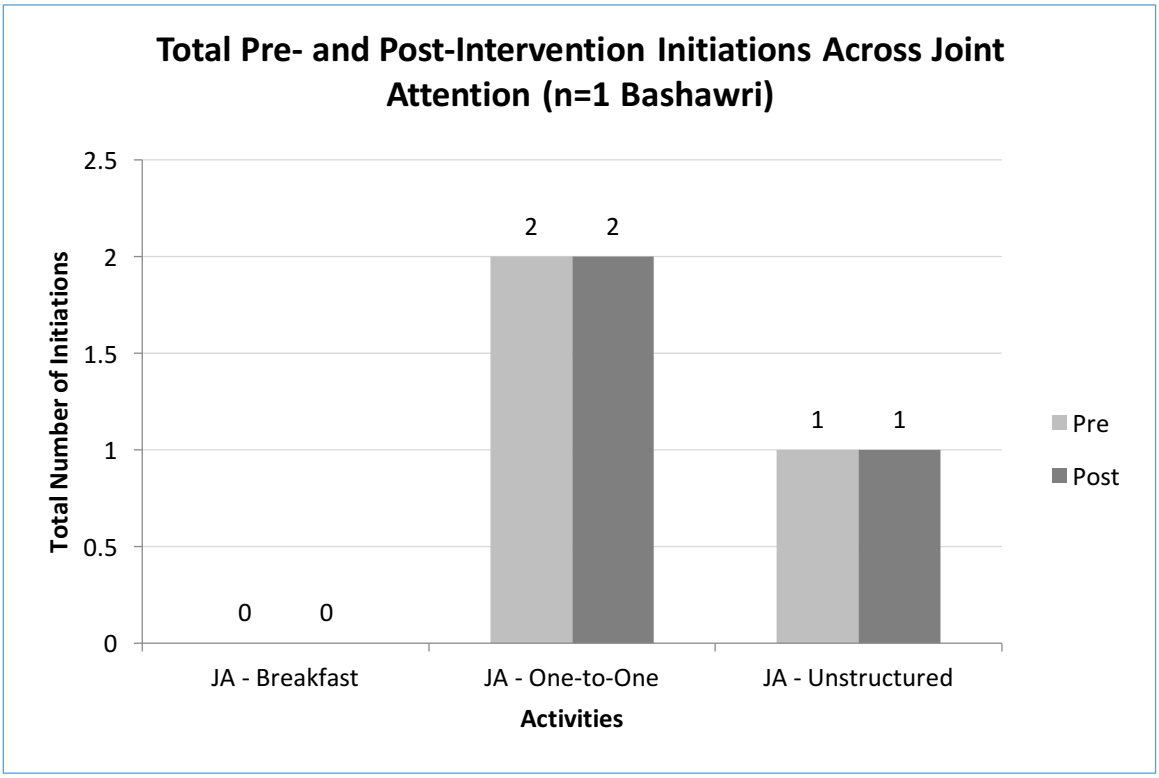
Table 12 records the changes in the type and frequency of pre-symbolic and symbolic methods of communication used by Bashawri. The frequency of communication initiations increased for all activities and for some functions, other than those that were unused either pre- or post-intervention.

Figure 25: Total Pre- and Post-Intervention Initiations Across Behaviour Regulation (n=1 Bashawri)



Communicative functions: joint attention across activities

Figure 26: Total Pre- and Post-Intervention Initiations Across Joint Attention (n=1 Bashawri)



Communicative functions: social interaction across activities

Figure 27: Total Pre- and Post-Intervention Initiations Across Social Interaction (n=1 Bashawri)

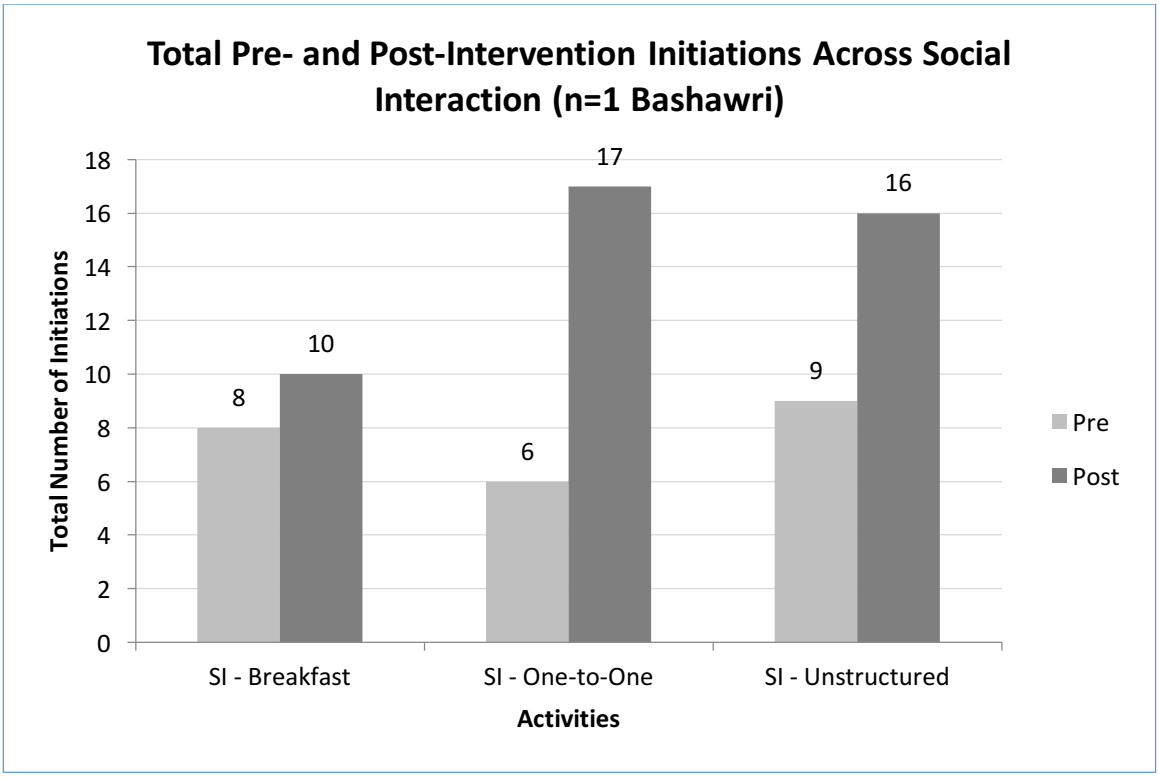


Figure 28: Total pre- and post-intervention initiations across communicative functions (Bashawri, n=1)

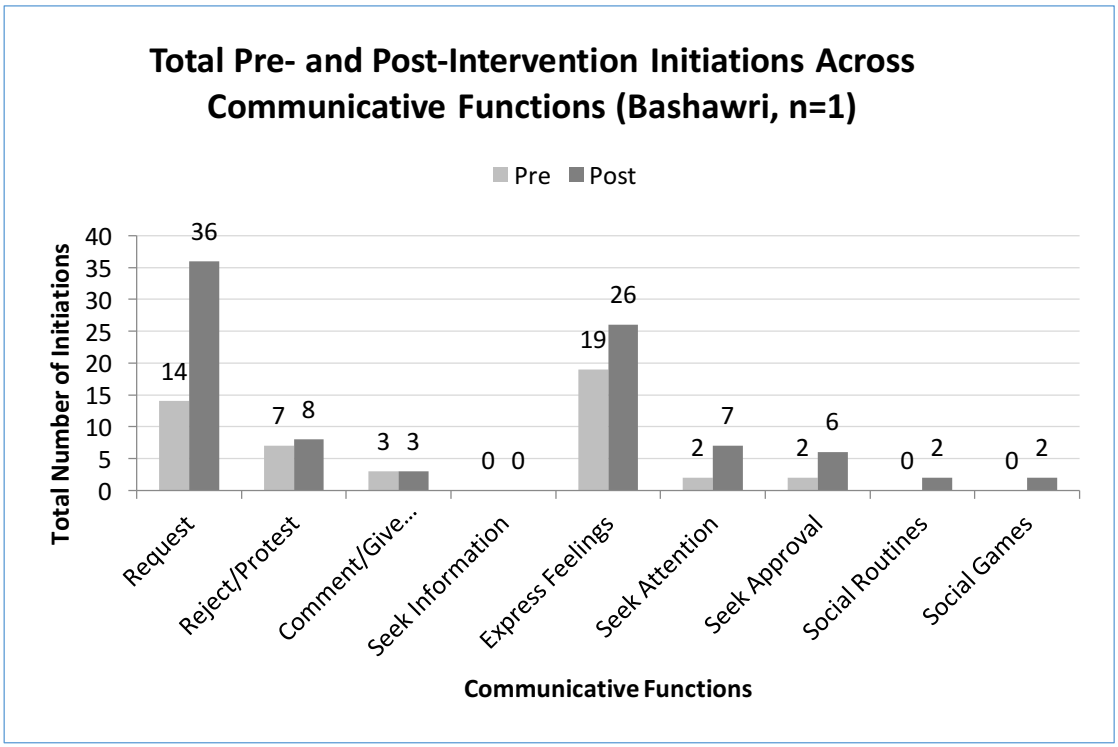
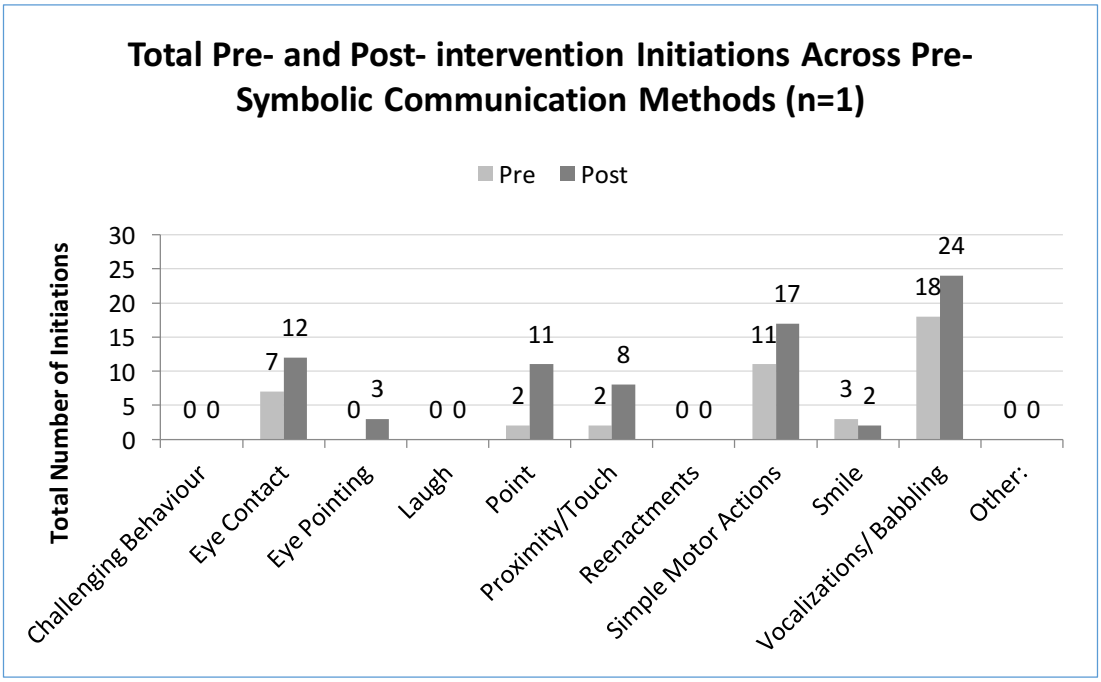


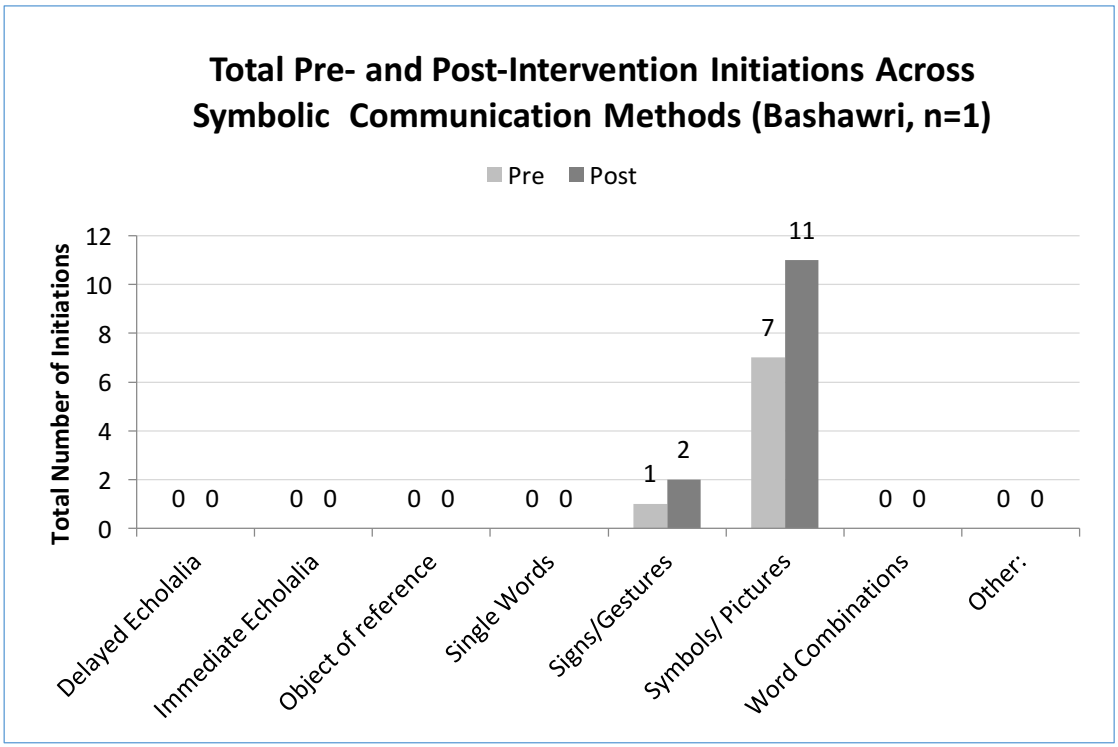
Figure 28, above, shows that Bashawri used most of the communication functions, and he initiated communication during all activities – breakfast, one-on-one and unstructured time. Following the intervention he initiated a few more communications when seeking approval and attention, slightly increased his use of rejections and protests, and significantly increased his use of requests, especially at breakfast.

Figure 29: Total Pre-Post Initiations Across Pre-Symbolic Communication Methods (Bashawri, n=1)



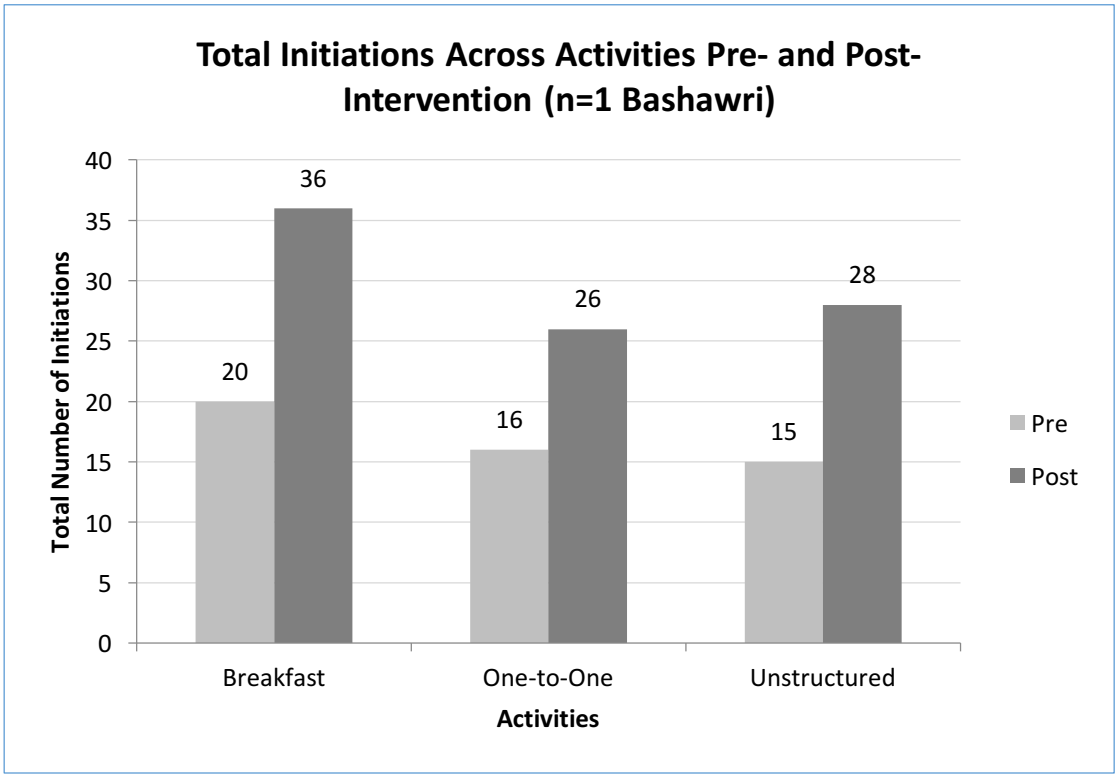
As shown in *Figure 29*, above, Bashawri did not display any type of challenging behaviour. Six of the functions showed marked increases in frequency following the intervention. In particular, pointing and touching were used far more often. Vocalising and simple actions continued to be his main method of expressing himself after the intervention. He also did not use four of the functions, and smiling was used less post- than pre-intervention, but it depended on the situation and his mood.

Figure 30: Total pre- and post-intervention initiations across symbolic communication methods (Bashawri, n=1)



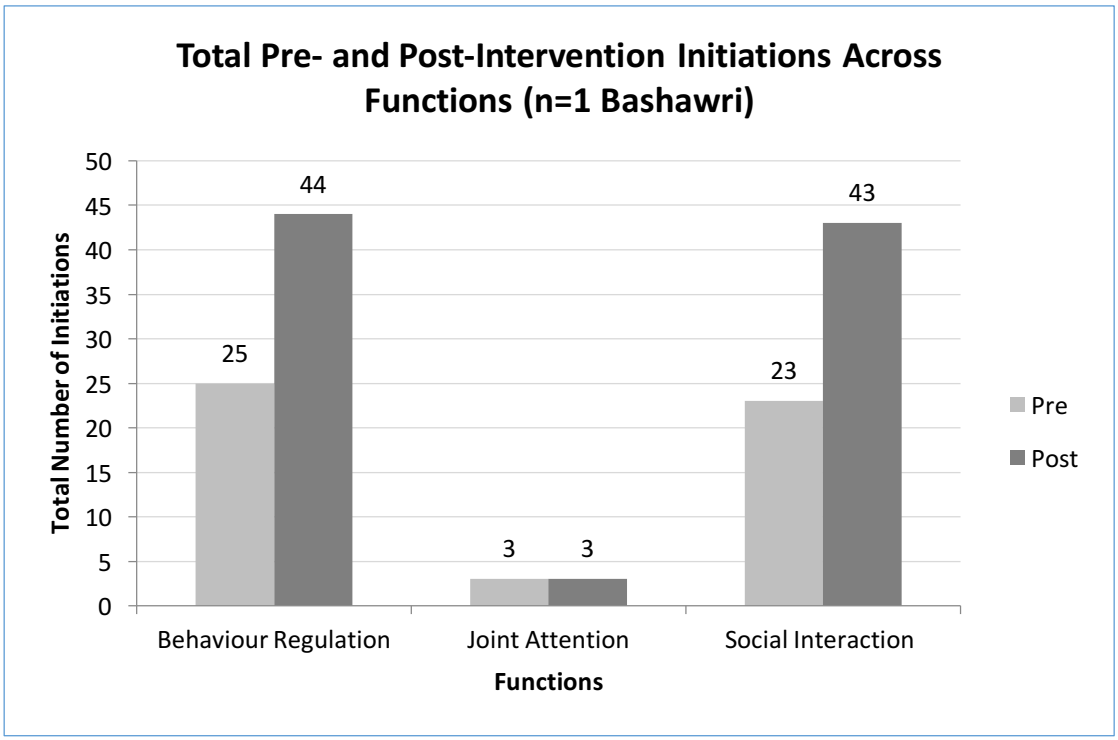
The noticeable feature of *Figure 30*, above, is that Bashawri used only a few forms of communication, although his use of signs and symbols increased in frequency after the intervention.

Figure 31: Total initiations across activities pre- and post-intervention (Bashawri, n=1)



The positive effects of the AISI intervention are evident in the overall increase in the frequency of initiations during all three activities. Bashawri displayed similar rates of initiation across all functions, but usually he was most communicative and animated during breakfast as the food is perceived as a reward by him.

Figure 32: Total pre- and post-intervention initations across communicative functions (Bashawri, n=1)



Most initiations were associated with behaviour regulation, though an increasing frequency occurred in response to social interactions, and these often entailed pointing and simple motor actions. There were no changes recorded with regards to joint attention.

Case study—Tasan

This section reports the pre- and post-intervention findings for Tasan, a child aged seven years at pre-intervention (see *table 13*). *Table 14* and *Figure 33* summarise the frequency of pre- and post-intervention communication initiations made by Tasan.

Table 13: Baseline details for (Tasan, n=1) (Pre-intervention)

Child (Name changed)	**Tasan**
Sex	Male
Age at pre-intervention assessment (in years)	7 years
Diagnosis	Autism
CARS score	43 [severe autism]
Level of verbal communication	Vocalisations
Level of initiation of communication	Based on school observations conducted for this study, and reports by staff that he has challenging behaviour and anxious, Tasan occasionally initiated communication with adults/teachers through symbols/pictures. Was not observed initiating communications with children.

Table 14: Frequency of initiations, pre- and post-intervention (Tasan, n=1)

CATEGORY	**Pre *(n)***	**Post *(n)***	**Change Score[1]**
INITIATIONS BY ACTIVITY			
Breakfast	24	53	29
One-to-One	28	36	8
Unstructured	29	38	9
INITIATIONS BY COMMUNICATIVE FUNCTION			
Total Behaviour Regulation (BR)	37	62	25
BR during Breakfast	14	29	15
BR during One-to-One	10	15	5
BR during Unstructured	13	18	5
Total Joint Attention (JA)	7	11	4
JA during Breakfast	2	3	1
JA during One-to-One	3	5	2
JA during Unstructured	2	3	1
Total Social Interaction (SI)	37	54	17
SI during Breakfast	8	21	13
SI during One-to-One	15	16	1
SI during Unstructured	14	17	3
INITIATIONS BY COMMUNICATIVE METHOD			

Request	12	43	31
Reject/Protest	25	19	-6
Comment/Give Information	7	11	4
Seek Information	0	0	0
Express Feelings	24	24	0
Seek Attention	9	13	4
Seek Approval	1	11	10
Social Routines	1	2	1
Social Games	2	4	2

[1]*Note.* Change in score is calculated as the difference between the initiations before and after the intervention.

Table 15: Frequency of initiations for communication methods: pre-symbolic and symbolic, pre- and post-intervention (Tasan, n=1)

PRE-SYMBOLIC MEANS	Pre	Post	Change Score[1]
Challenging Behaviour	29	8	-21
Eye Contact	6	13	7
Eye Pointing	4	6	2
Laugh	6	4	-2
Point	3	16	13
Proximity/Touch	3	12	9
Re-enactments	0	0	0
Simple Motor Actions	9	11	3
Smile	0	2	2
Vocalisations/Babbling	15	31	16
Other:	0	0	0
SYMBOLIC MEANS			
Delayed Echolalia	0	0	0
Immediate Echolalia	0	0	0
Object of Reference	0	0	0
Single Words	0	0	0
Signs/Gestures	0	3	3
Symbols/Pictures	7	21	14
Word Combinations	0	0	0
Other:	0	0	0

[1]*Note.* Change in score is calculated as the difference between the initiations before and after the intervention.

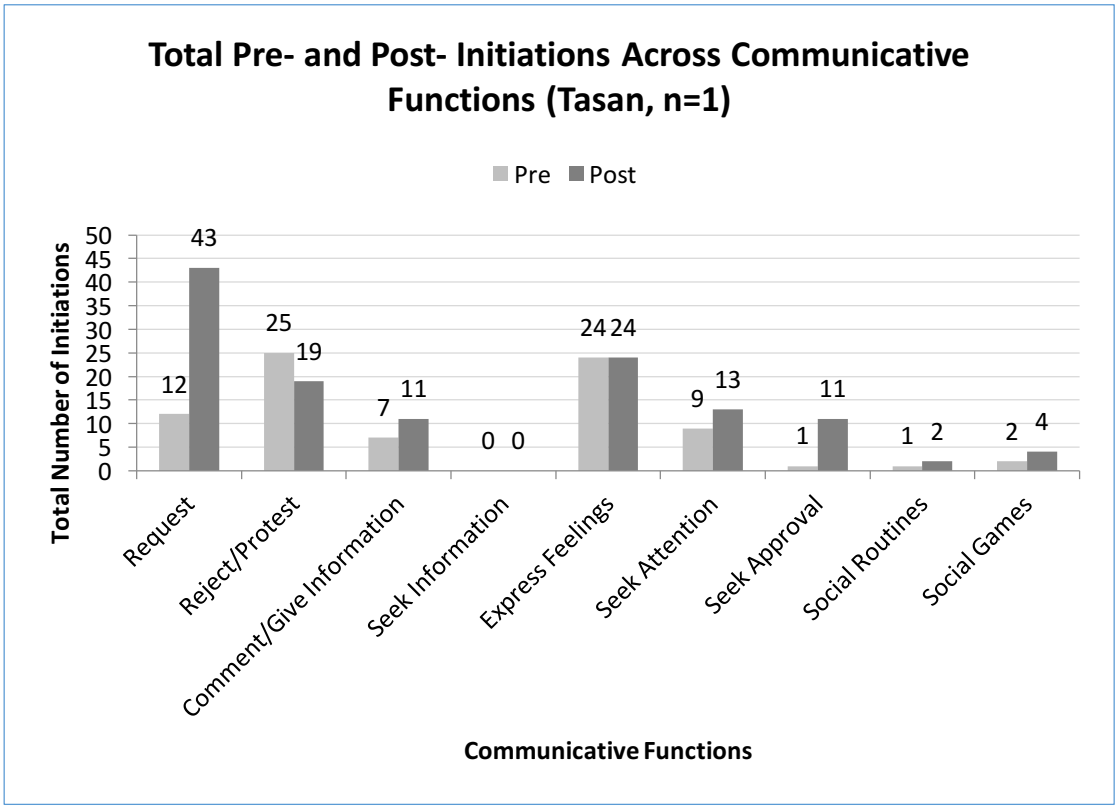
Table 14 lists the type and frequency of communication initiations by Tasan while performing three activities. The activities (breakfast, unstructured play, and 1:1 work) were of 40 minutes duration each, and were recorded during observation periods of two hours pre- and two hours post-intervention.

It can be seen that for most forms of behaviour there were significant positive changes in communication initiations. As noted below, many initiations occurred during breakfast, a time when Tasan was usually quite active and animated. It is not clear why there were no measurable changes in Tasan's initiation of communication through his information

seeking. He also expresses his feelings equally in both pre- and post-intervention. Significant changes in behaviour regulation resulted from the intervention in all of the functions, with breakfast activities showing the most notable increase and changes (see *Figure 33*). It is evident that Tasan's frequency of communicative attempts post-intervention increased for joint attention (see*, Figure 34*). Furthermore, the results indicated that post-intervention, the number of initiations increased noticeably in all activities during social interaction, with the most significant change occurring during breakfast, i.e. when Tasan was more active.

Table 15 records the changes in the type and frequency of pre-symbolic and symbolic methods of communication recorded during observation periods of two hours' duration. It is relevant to note that for most forms of communication behaviour there were marked increases in frequency of initiations. It is also significant that the number of instances of challenging behaviour diminished more than three-fold, perhaps an indication that Tasan was better able to express himself and so was less frustrated by particular situations.

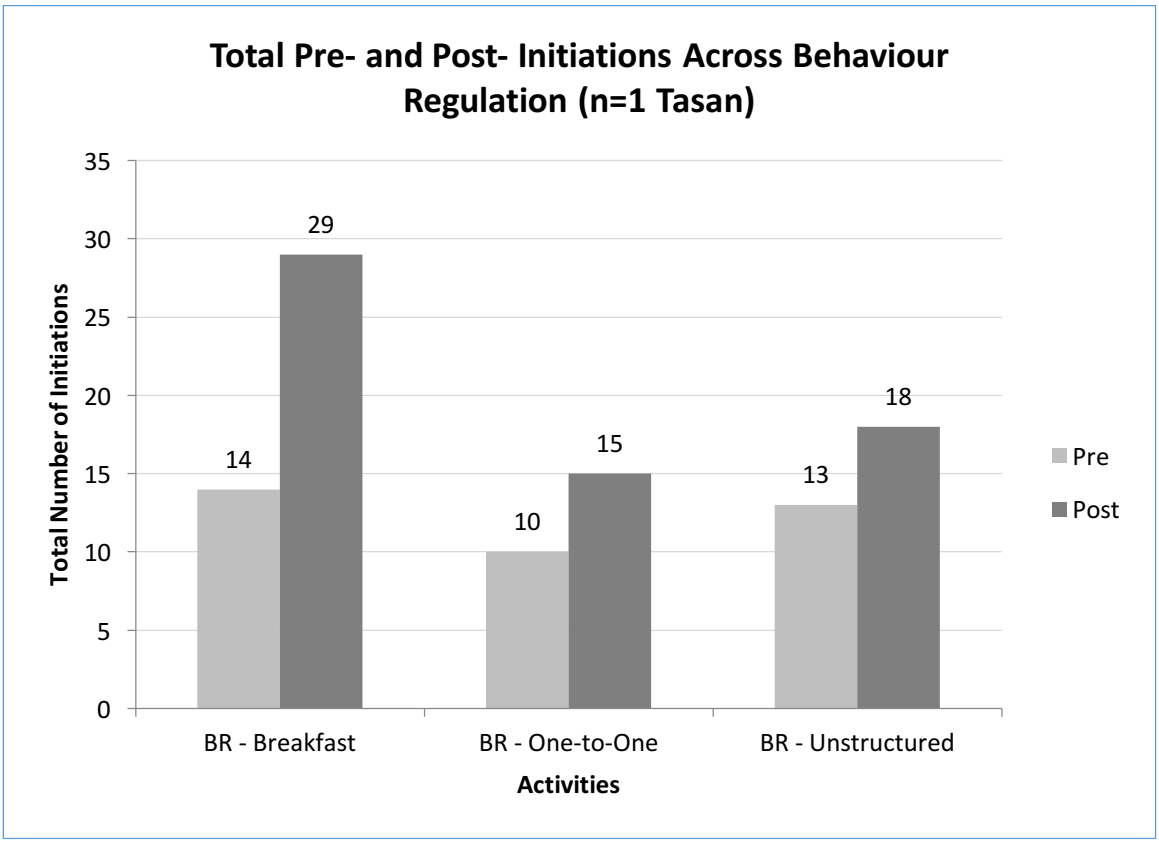
Figure 33: Total Pre- and Post- Initiations Across Communicative Functions (Tasan, n=1)



It is notable that in all but two of the categories there were positive changes arising from the interventions. The changes benefited Tasan insofar as they enabled him to participate more fully in activities. The most marked increases were in the frequency of requests and seeking approval. On the other hand, Tasan's expressions of protest and rejection diminished–a sign that he was using more positive ways of communicating in response to different situations. There were no changes in his use of the "seek information" and "express feelings" functions

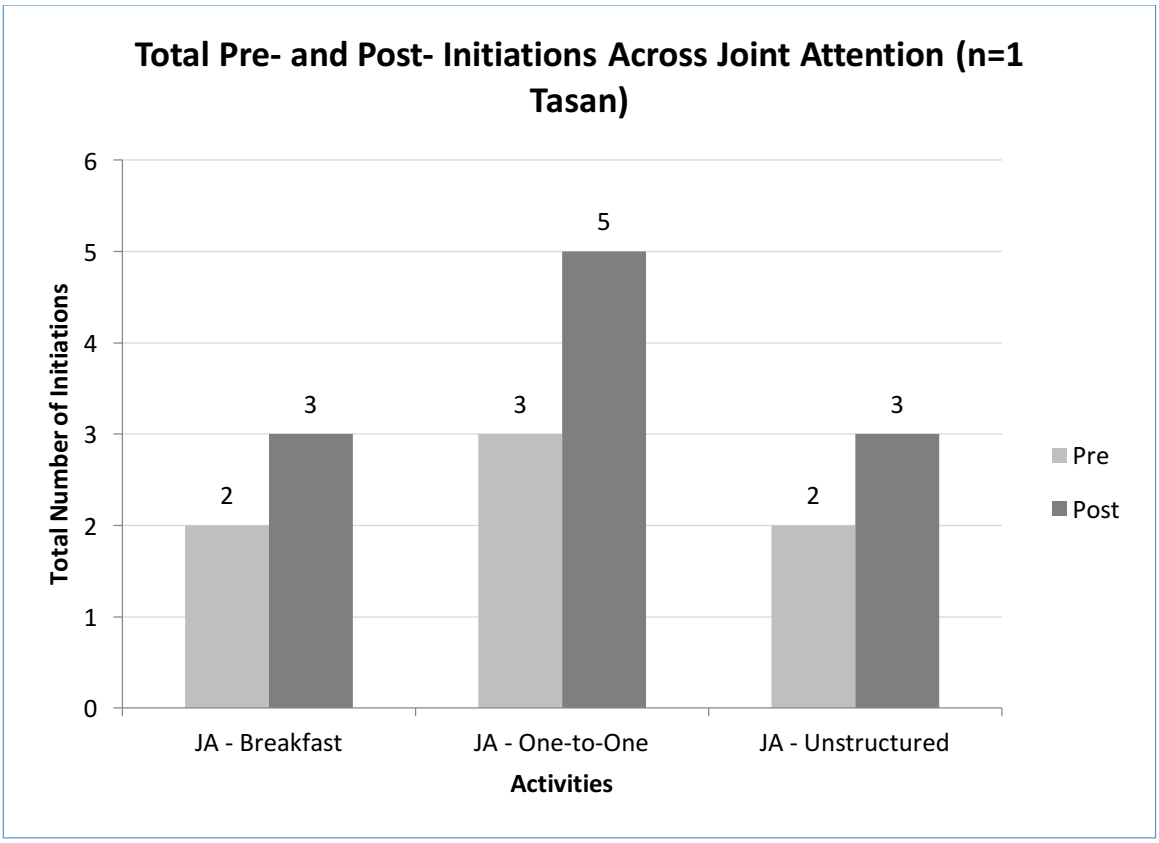
Communicative functions: behaviour regulation across activities

Figure 34: Total Pre- and Post- Initiations Across Behaviour Regulation (n=1 Tasan)



Communicative functions: joint attention across activities

Figure 35: Total Pre- and Post- Initiations Across Joint Attention (n=1 Tasan)



Communicative functions: social interaction across activities

Figure 36: Total Pre- and Post- Initiations Across Social Interactions (n=1 Tasan)

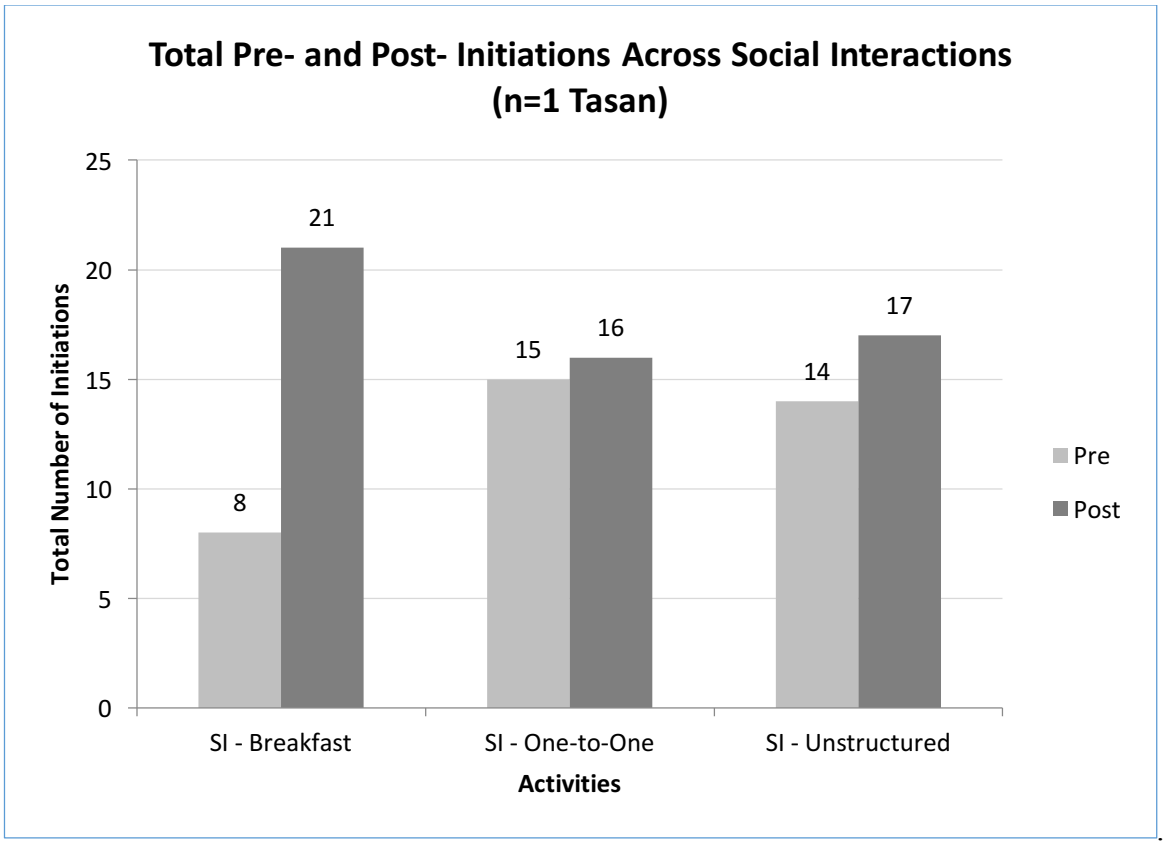


Figure 37: Total Pre- and Post-Initiations Across Pre-Symbolic Communication Methods (Tasan, n=1)

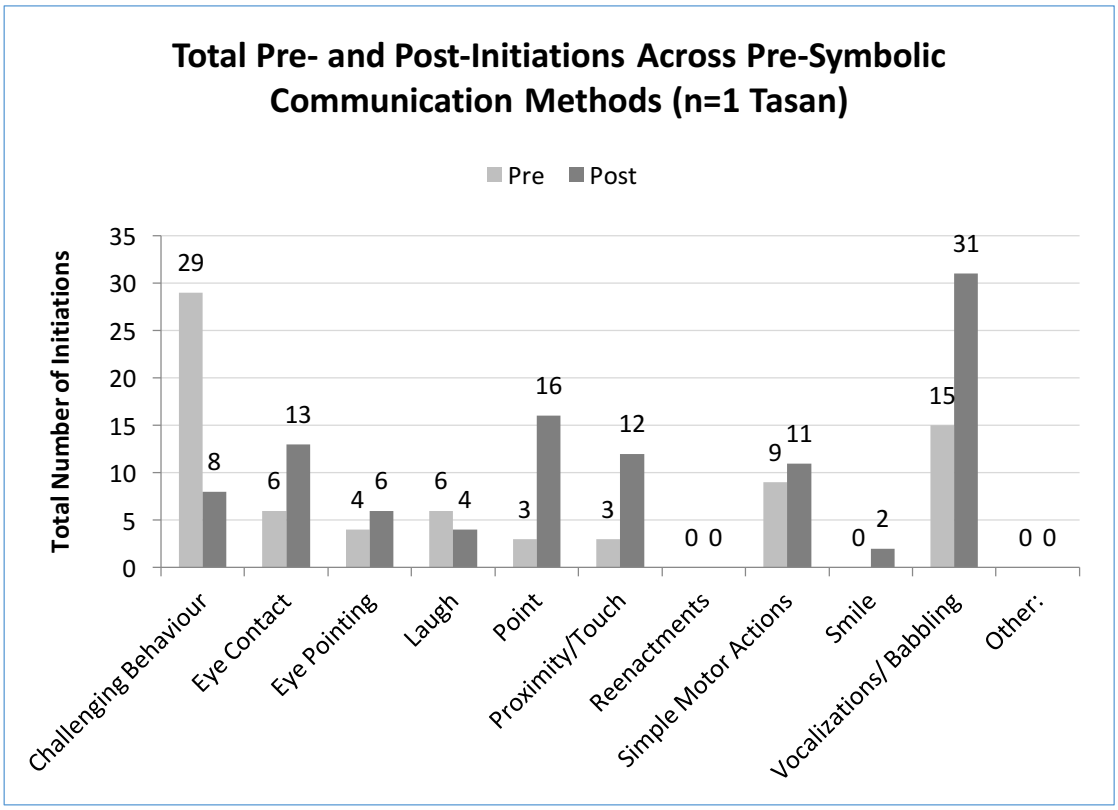


Figure 37 summarises the changes in Tasan's pre-symbolic forms of communication, and it can be seen that there were significant changes for most functions. The most marked changes were in eye contact, pointing, touching, and vocalisations. It is not clear why laughing was less frequent in the post-intervention stage, it might be due to a change in the child's mood. The increased ability to initiate communications may explain the reduction in challenging behaviour, because Tasan was able to express himself in other ways and so may have experienced less frustration.

Figure 38: Total Pre- and Post- Initiations Across Symbolic Communication Methods (Tasan, n=1)

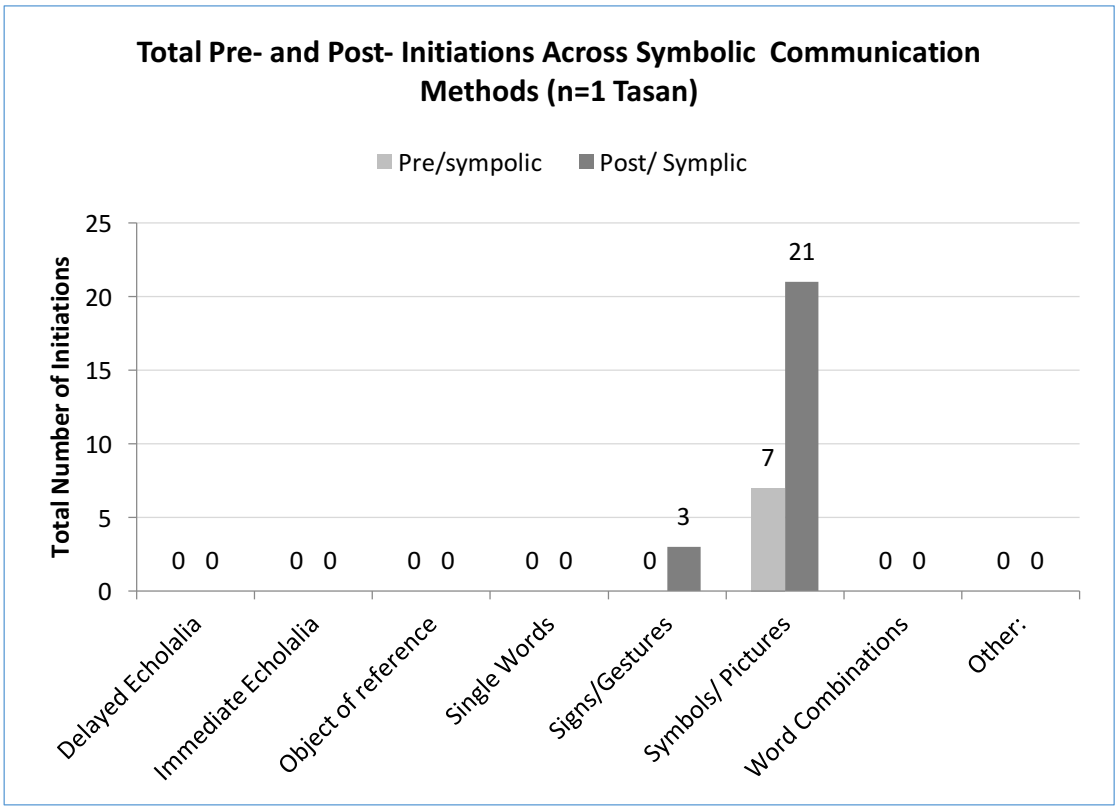
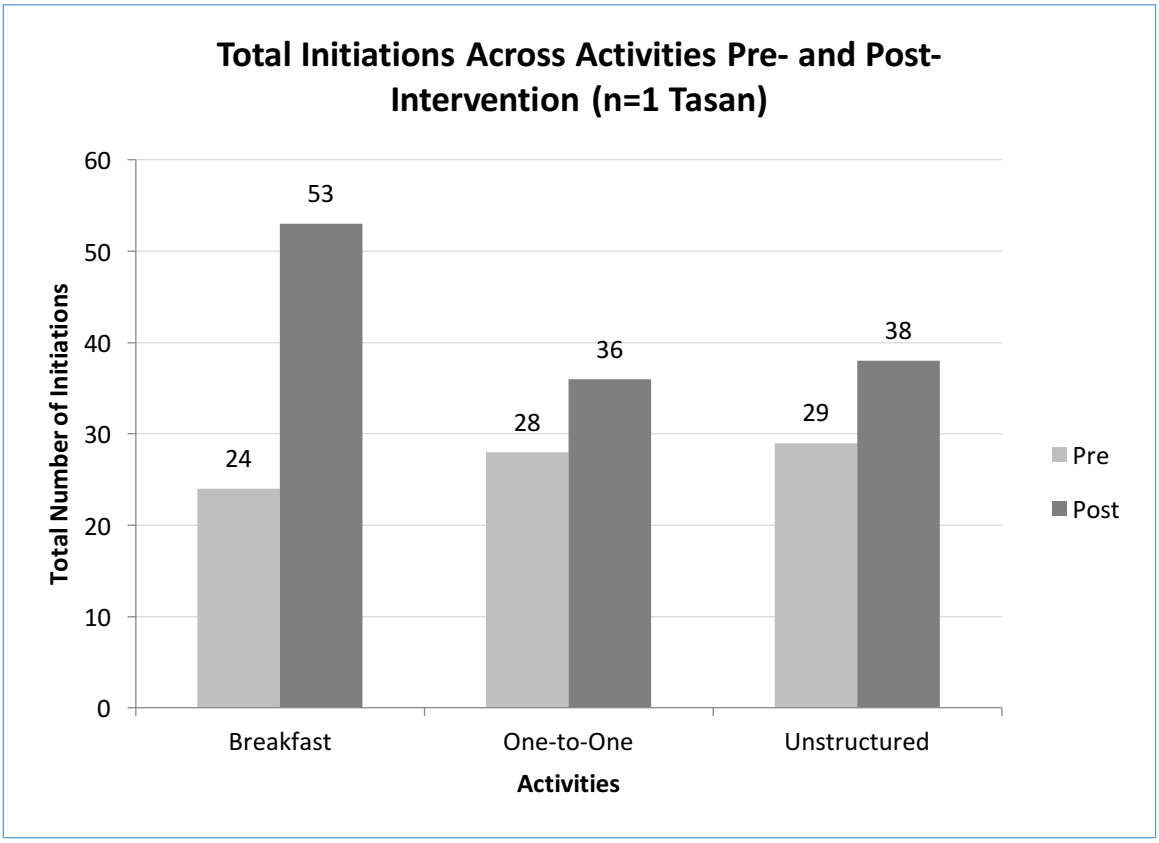


Figure 38 shows that following the intervention Tasan initiated most communications by way of symbols and pictures. There was some increased use of signs and gestures, but he did not use any kind of spoken language or echolalia.

Figure 39: Total initiations across activities pre- and post-intervention (Tasan, n=1)



It is apparent that there were marked increases in the frequency of initiations, and it is pertinent to note that a greater degree of increase in initiating communication were recorded during the breakfast period, a time when Tasan was usually quite active and his teacher was able to interact with him.

Figure 40: *Total pre- and post-intervention initiations across functions (Tasan, n=1)*

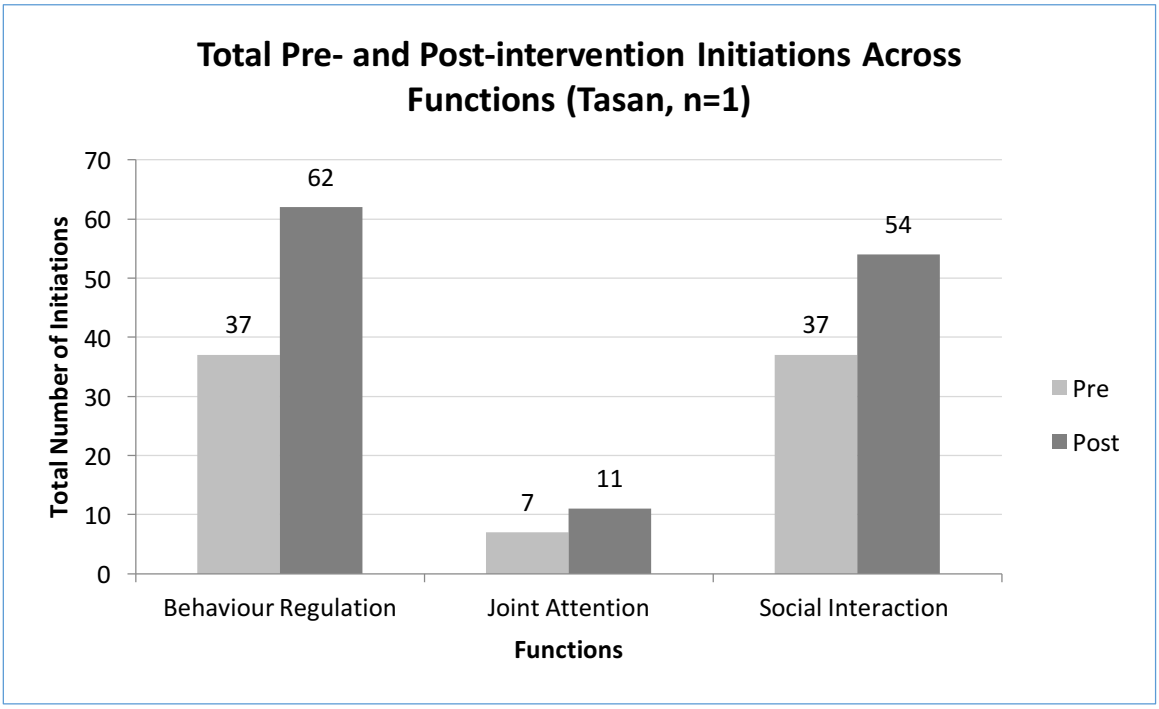
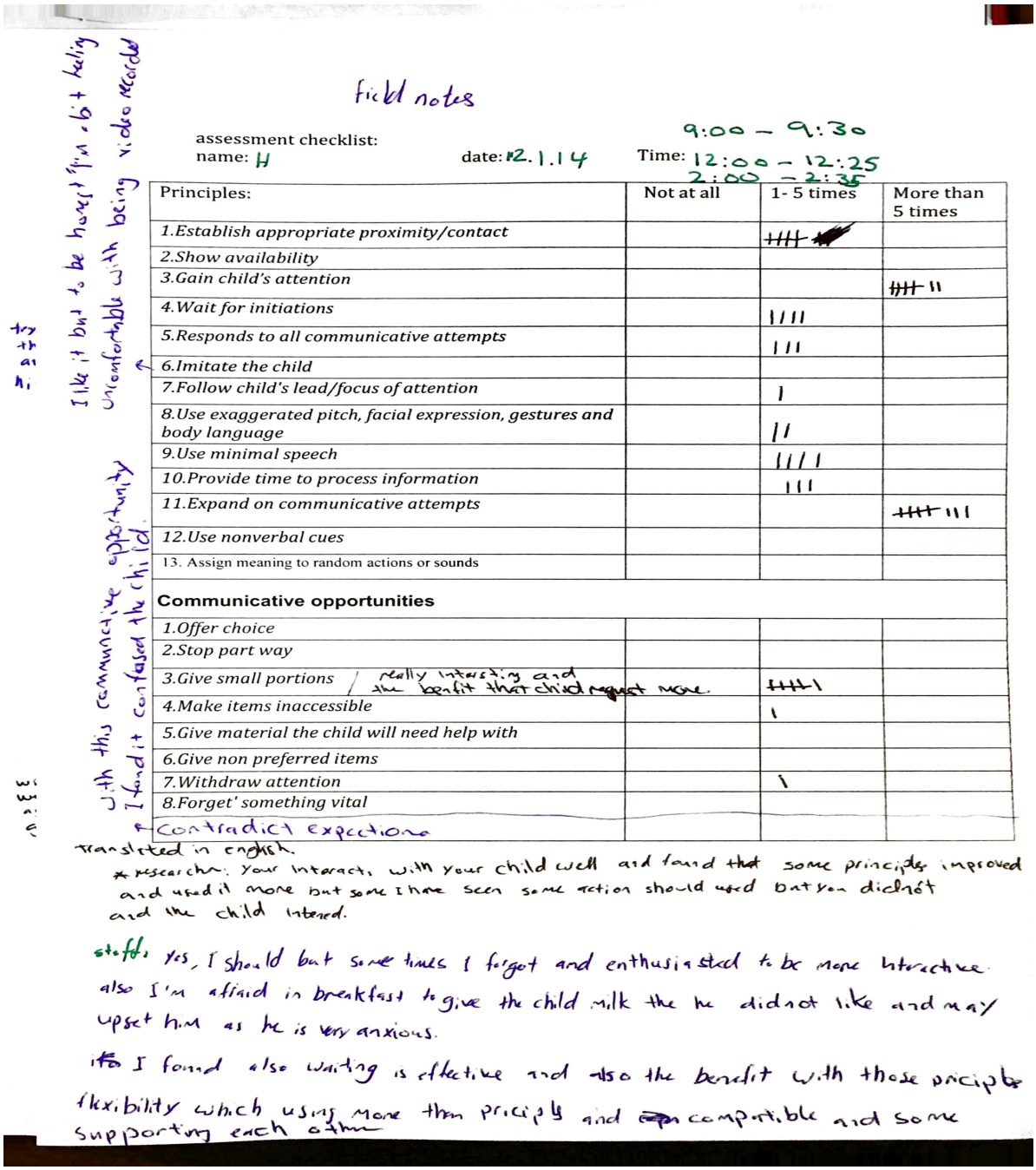


Figure 40 summarises the communication changes exhibited by Tasan. For all three functions there were marked increases in the frequency of initiations, testament to the benefits of the intervention. The changes in behaviour regulation were also reflected in the diminished number of expressions of protest and rejection (see *Figure 33* above)

APPENDIX 21: SAMPLE OF FIELD NOTES DATA

These two pages provide a sample of the field notes data.



field notes

assessment checklist:
name: H date: 12.1.14 Time: 12:00 – 12:25 / 2:00 – 2:35 / 9:00 – 9:30

Principles:	Not at all	1- 5 times	More than 5 times
1.Establish appropriate proximity/contact		𝍸	
2.Show availability			
3.Gain child's attention			𝍸 II
4.Wait for initiations		IIII	
5.Responds to all communicative attempts		III	
6.Imitate the child			
7.Follow child's lead/focus of attention		I	
8.Use exaggerated pitch, facial expression, gestures and body language		II	
9.Use minimal speech		IIII	
10.Provide time to process information		III	
11.Expand on communicative attempts			𝍸 III
12.Use nonverbal cues			
13. Assign meaning to random actions or sounds			
Communicative opportunities			
1.Offer choice			
2.Stop part way			
3.Give small portions / really interesting and the benefit that child request more		𝍸 I	
4.Make items inaccessible		I	
5.Give material the child will need help with			
6.Give non preferred items			
7.Withdraw attention		I	
8.Forget' something vital			
Contradict expectations			

I like it but to be honest I'm a bit feling uncomfortable with being video recorded

With this communicative opportunity I found it confused the child

translated in english.

* researcher: Your interact, with your child well and found that some principles improved and used it more but some I have seen some action should used but you didn't and the child intend.

staff: yes, I should but some times I forget and enthusiastic to be more interactive also I'm afraid in breakfast to give the child milk the he did not like and may upset him as he is very anxious.

I found also waiting is effective and also the benefit with those pricipls flexibility which using more than pricipl and compatible and some supporting each other

Assessment checklist
Name: Olfat

Class: A
date 22.1.14

21-1-14
10:00 - 10:30
11:00 - 11:300
Time 11:15 - 11:45
12:00 - 12:30
1:30 - 2:00

General Principles	Not at all	1-5 times	Many times
1. Gain children's attention			𝍸 𝍸
2. Establish appropriate proximity and contact			
3. Show you are available to the children			
4. Wait for initiations		𝍸 I	
5. Respond to the children's attempts to communicate			𝍸 II
6. Assign meaning to the children's apparently random actions or sounds			
7. Imitate the children		[redacted] III	
8. Follow children's focus of attention			
9. Use exaggerated pitch, facial expression, gestures and body language		𝍸 II	
10. Use minimal speech		𝍸	
11. Provide time		II	
12. Expand on communicative attempts			𝍸 𝍸 II
13. Use non-verbal cues			
Communicative Opportunity			
1. Give a choice of activity, equipment or food		II	
2. Stop part-way through an activity or social interaction			
3. Give small portions (so children can ask for more)		𝍸 𝍸	
4. Make items inaccessible (so children have to ask for them)		I	
5. Give children materials that they will need help with			
6. Contradict children's expectations			
7. Give children known non-preferred items			
8. Set up a situation where you 'forget' something vital		II	
9. Withdraw the child attention			

try to mirror the child and support him.

we foaund its best way to keep the child ask for more

with this opp we don't recognise as the child getting upset.

Sometimes you act too soon and you need to wait for at least five seconds.

staff: it's human nature and by mistake as I'm enthiusiast to engage with child to interact with him.

with regard to "minimal speech" sometimes you speek and may the child confuse or did not recognise

staff: ~~it~~ it might be a culture could and we speak too much sometimes and try to withdraw the child attention.

with regard providing time: we were not used to waiting long before repeating the prompt, thereby intervening too soon but after while we the beneficial and we could use more than one principle.